ARCHIVES OF OPHTHALMOLOGY.

REPORT OF FOUR HUNDRED AND FIFTY SIMPLE EXTRACTIONS OF SENILE CATARACT.

FROM PROF. SCHWEIGGER'S UNIVERSITY EYE CLINIC.

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THE extraction of senile cataract without iridectomy has so far obtained less of a foothold in Germany than in France, England, and America; less, in fact, than it has actually deserved. Pagenstecher and Steffan have raised their voices against the new method, and Alfred Graefe[1] thinks "so long as it cannot be proved that the iridectomy interferes with the cicatrization of the incision, or subsequently injures the functions of the eyes, and so long as it is true that iridectomy prevents prolapse of iris, and reduces the number of incarcerations, then in my opinion every attempt to make a principle of the omission of an iridectomy must be regarded as a fatal and retrograde movement in operative ophthalmology."

The only answer to such and even heavier reproaches can come from those who have an extensive amount of material at their command. If statistics can only prove to us that the successes and the failures are alike or nearly so in both methods, the superfluity of the removal of a portion of the iris will be demonstrated and manifest in suitable cases.

For these reasons it may be worth the while to review the case books of this hospital under the care of a man who has shown himself one of the most ardent defenders of the new method.

[1] *v. Graefe's Archiv*, Bd. xxxiv., 3, p. 225.

The number of cases was verified from the books of the institution, and the figures include all the operations, even those performed by the assistants during the absence of Professor Schweigger. The sight was tested when the patient left the hospital, generally on the twentieth day, and only occasionally when it was plain that the turbulence of the patient had contributed to a poor result was the acuteness of sight tested at a later visit.

I would also emphasize the fact that all of the patients were from the University Hospital, not from the private hospital,—a fact deserving of notice in so delicate an operation as cataract extraction, because the behavior of the patients has a great deal to do with the results, better results being generally obtained in private patients than in the dirty and unruly inmates of general hospitals.

Schweigger reported the results of his first few cases of simple extraction at the Heidelberg Ophthalmological Congress in 1888 (Report, p. 135), and for the sake of completeness I will here recapitulate whatever is indispensable in his paper.

The operation was first done with Beer's triangular knife, with a downward flap entirely in the corneal tissue, and embracing half of the cornea, capsulotomy with the ordinary cystotome; eserine after completion of the operation. The first ten patients thus operated upon had been operated upon before in the other eye with an iridectomy.

The results at the time of discharge from the hospital were eight cases with vision between $\frac{1}{2}$ and $\frac{1}{6}$, making 80 % of successes. One patient had a prolapse of iris, abscised in a fortnight, with S = $\frac{1}{6}$. The other two patients were discharged with secondary cataract, both capable of improvement at a later date.

The large section of the old school is a necessity in the new operation. Nothing can be worse than too small a section. The broad knife was chosen for that reason as well as to make the section as smooth and as even as possible.

In the next thirteen cases the section was made upward, still in the cornea, and the cystotome still used. The results were between $\frac{1}{2}$ and $\frac{1}{6}$ in ten cases, $\frac{1}{18}$ in one case,

which later by discision was raised to $\frac{1}{4}$. In one case there was prolapse of iris with S = $\frac{1}{8}$, and finally one case was lost from infection of the vitreous.

A following series of cases was operated upon with Schweigger-Foerster's capsular forceps, and these we will collect into one group in order to compare them with former statistics in which the same forceps were used, but with an iridectomy.

Beer's broad knife, which at a distance of 30 *mm* from the point is 4 *mm* high, was soon supplanted with one 5 *mm* high, and later still with one 7 *mm* high, a proof of the pressing advantages of a broad knife. The section was made upward in 117 cases. We first attempted to reduce the pressure on the eyeball to a minimum by holding the lids apart with the fingers, but soon found it disadvantageous to the operator. After trying various écarteurs we finally decided in favor of simple lid-holders. With these the assistant separates the lids (whilst the operator makes the incision), and thus is able to oppose or softly yield in a moderate degree to any pressure with the lids involuntarily exercised by the patient. The lid-holders are removed the moment that the section is completed. The lens is then removed whilst the eye is kept open by the fingers of the operator and his assistant.

We avoid tearing the conjunctiva during the operation by rejecting fixation forceps, merely using a two-tined fork to press, as it were, the eyeball against the knife during the completion of the section. But in avoiding the fixation forceps it seems as if the downward section be preferable, because anxious patients often roll the eyeball upward and endeavor to conceal it under the upper lid.

Twenty-five cases were operated on with the downward section and the capsular forceps, so that we get a series of 142 extractions in which the capsular forceps were used, with the following results:

Calculating S = $\frac{1}{8}$ as a good result, we have

Perfect success,	104	= 73.3 %
Secondary cataracts,	30	= 21.1 %
Losses,	8	= 5.6 %
	142	100 %

The vision obtained in the 142 cases was $\frac{6}{6}$ in 5 cases, $\frac{6}{12}$ in 19, $\frac{6}{18}$ in 38, $\frac{6}{24}$, in 22, and $\frac{6}{36}$ in 20 cases.

There was not a single case of $\frac{6}{6}$ at the time of discharge, owing to the greater or less amount of astigmatism which is present at an early stage, but gradually decreases or disappears. I am of the opinion that in order to get S = 1 in the statistics, one needs a little indulgence on the part of the physician, or even the use of various test type, and perhaps of hook letters. We have, however, found three cases noted at a later date as having S = 1, but the data are defective, and no actual claim of that amount shall be made in this paper.

Secondary operations were performed on 16 of the 30 capsular cataracts, all of which but one gained by the operation, and 8 above S = $\frac{1}{6}$, so that they are to be added to the good results. The cases which were discharged without any chance for improvement, or with preservation of a small amount of sight, are all included under the head of losses.

Two of the losses ought to be excluded because they were complicated, the one with irregular astigmatism from old leucomata of the cornea, the other with choroiditis at the macula.

The remaining six losses were due: one to hemorrhage into the anterior chamber directly after the operation, two to a low form of irido-choroiditis, secondary cataract, posterior synechiæ and thickening of the iris, S = $\frac{1}{200}$ and no chance for improvement; one to prolapse of iris with useful sight at first, then irido-cyclitis and amaurosis; three other cases were lost from infection of the section. If now we wish to put our statistics in a more favorable light, we shall, by omitting the complicated cases, have 140 operations resulting as follows:

Successes 104 + 8 (by discision), =	112 =	80 %.
Half successes	22 =	16.8 %.
Failures	6 =	4.2 %.
	140	100 %.

The cases of prolapse of iris are of great interest, nine in number, of which eight were abscised.

1. S = $\frac{6}{24}$.
2. S = $\frac{1}{6}$, later $\frac{6}{36}$, still later $\frac{6}{12}$.
3. S = $\frac{6}{12}$, later $\frac{6}{6}$, Schweigger's type 0.4 at 25 *cm.*
4. S = $\frac{1}{24}$, astigmatism; no further notes.
5. S = $\frac{1}{12}$, later $\frac{1}{6}$.
6. S = $\frac{1}{12}$, later $\frac{1}{6}$.
7. S = $\frac{1}{6}$, later $\frac{6}{18}$.
8. S = $\frac{1}{12}$; macula of cornea.
9. S = $\frac{6}{18}$, later $\frac{6}{12}$.

Prolonged observation showed that five eyes obtained and preserved $\frac{1}{6}$ and even more; one with macula of cornea is not counted, one with S = $\frac{1}{24}$ was not seen again, but it could surely be improved, and the last case obtained $\frac{1}{6}$ after discision.

This shows that the fate of eyes with prolapse of iris is by no means hopeless.

Although we are able to assert that the large majority of cases of prolapse have wonderfully improved and preserved their sight, yet we will not fail to mention that one case, after maintaining excellent sight for more than two years, finally succumbed to choroiditis with increased tension. It is, however, doubtful if the loss can correctly be ascribed to the original prolapse. The history of this case shall be reported farther on.

The xvi. vol. of these ARCHIVES, page 263, contains the statistics of 122 combined extractions at our clinic with the capsular forceps. The results were:

With iridectomy (February, 1883 to March, 1884).

Successes, . .	89 =	72.9 %.
Secondary cataract,	27 =	22.2 %.
Losses . . .	6 =	4.9 %.
	122	100 %.

Comparing these with the present simple extractions we have (1887–1888):

Successes . .	104 =	74.3 %.
Secondary cataract,	30 =	21.4 %.
Losses . . .	6 =	4.3 %.
	140	100 %.

Comparisons of the results of operations in different hospitals always hitch a little here and there. The way in which the operation is done, the operator's skill, the manner in which the statistics are made out,—all are different. And for that reason it is all the more interesting to compare the extractions in the same clinic, some with and others without the iridectomy, and then to find an agreement so general in every respect.

The next series of cases was operated with v. Graefe's cystotome, and a knife *7 mm* high 30 *mm* from the point, in fact just such a wedge-shaped knife as is depicted in Zehender's Monatsblaetter (Band ii., p. 73), with a convex curve of the cutting edge. Up to the end of the year 1889 we performed 235 of these simple extractions with the section downward.

The results were as follows:

Complete successes,	185 =	79 %.
Secondary cataract,	39 =	16.2 %.
Losses . . .	11 =	4.8 %.
	235	100 %.

There were twenty cases of prolapse of the iris including the most minute.

1. The amount of sight regained was as follows:

$S = \frac{6}{9}$	10
$S = \frac{6}{12}$	32
$S = \frac{6}{18}$	54
$S = \frac{6}{24}$	48
$S = \frac{6}{36}$	41
	185

2. Some of the cases of secondary cataract may of themselves have obtained $S = \frac{1}{6}$, and in point of fact ten actually obtained this amount after a discision. Others were improved considerably.

One case was marked as a failure although when discharged $S = \frac{1}{100}$. Two additional cases of $S = \frac{1}{200}$ (occlusion of the pupil) were operated upon without success, so that these three last cases are included amongst the losses.

3. In place of the three cases which belong to the losses we have three others which were complicated.

Case 1.—Mr. D., October 15, 1889. Right eye, operation smooth, pupil round, secondary cataract, S = $\frac{1}{30}$. Later discision, clear opening, S = $\frac{1}{24}$. Central scotoma for red and green ; patient smokes enormously. Suitable treatment was ordered, but the patient did not again report.

Case 2.—Was about to have been operated on elsewhere a year before, but owing to incipient insanity was dismissed without the operation.

March 18, 1889, operation apparently successful, but the patient, who was rational in the early days subsequent to the operation, could not tell what he saw at the date of his discharge owing to a return of insanity.

Case 3.—Macula of the cornea, S = $\frac{1}{12}$.

In one case, directly after opening the capsule the lens fell into the vitreous and could not be extracted even with the various hooks and spoons at our disposal. The cause of the luxation could not be discovered. S at time of dismissal $\frac{1}{9}$, but, as I learned by inquiry, the eye was slowly lost by irido-choroiditis.

Still another case was lost by hemorrhage into the anterior chamber.

Six eyes were lost from suppurative keratitis or hyalitis, with S = $\frac{1}{200}$ to 0. Amongst these, one eye was infected from a dacryocysto-blennorrhœa. Schweigger operates in these cases of lachrymal suppuration in the following manner, and this is the only case that he has lost from this cause in many years. On the day before the operation the lachrymal sac is split broadly open, and tamponed with sublimated cotton. After some hours, and when the hemorrhage has ceased, the tampon is removed, little rods of iodoform introduced, and then a sublimated tampon again applied. The iodoform rods are renewed once more previous to the operation, and after the operation they are changed daily.

A second case of infection was entirely due to the stupidity of the patient, who, in spite of the greatest care and watchfulness, repeatedly jumped out of bed, pulled off his bandages, and rubbed his eyes. The cause of the infection in the other cases was not discoverable.

It is very curious that in Prof. Schweigger's private hospital there has not been a single case of infection after extraction since the introduction of strict asepsis, whilst in the University Hospital, where precisely the same aseptic precautions have been scrupulously carried out, it has been impossible to avoid an occasional loss from infection of the corneal section. If aërial infection were not most positively denied by the most competent authorities, our first thoughts would run in this direction. Still, the hygienic conditions in the hospital leave much to be desired, although we hope to remove them soon by alterations in the building, whilst the neighborhood of the surgical clinic makes itself felt even in our wards.

All extractions now being regarded as dangerous operations, are no longer made in the large auditorium infected by the previous presence of a large number of persons, but in a smaller apartment and in the presence of but few spectators.

Our asepsis consists in the following procedures: On the evening before the operation, the skin around the eye to be operated upon is cleansed with ether, and then the eye as well as both the upper and lower everted eyelids are thoroughly laved with a 1 to 5,000 sublimate solution. The eye is then closed with a well-fitting pad of borated cotton, soaked in the sublimate solution. This remains till the moment fixed for the operation, when the conjunctiva is once more abundantly irrigated with the sublimate. The instruments are placed in a four-per-cent. solution of carbolic acid. It is well known that the eye will not tolerate so high a percentage, either of carbolic acid or sublimate, as is needed for disinfection, and for this reason we dilute this strength of acid on the instruments by a brief immersion in boiling water at the bedside of the patient.

It is an old experience, that the larger the clinic and the greater the number of attendants, the higher the percentage of suppuration. Amongst many hands, one is easily unclean, and here or there occurs the deadly sin of omission. Therefore we must try in every possible way to eliminate all those minute sources of failure and so perfect our method of operating.

Attention has already been called by various observers to the septic qualities of the cocaine solutions instilled into the eyes previous to the operation, and bacterial investigations have shown the masses of filth-bacteria that rapidly develop in such solutions. Actual boiling of the cocaine solution, just before the operation, as recommended by Eversbusch, must be useful. Only we must not forget that repeated boiling affects the strength of the cocaine by condensation of the water of solution. We may also recommend Sattler's method of preserving the cocaine in a sublimate solution of 1 to 10,000 or of 1 to 5,000, though Inouye has shown that the cocaine unites with the sublimate into an organic salt.

In order to avoid infection of the bandage with soiled hands I would also recommend that it as well as the cotton ought to be kept in one of Koch's steam sterilizers until the eye is ready to be covered, when both bandage and cotton can immediately be applied to the eye without being touched by the hand of any other person than the regular assistant. Since the opening of 1890 and the use of this method of bandaging, we have had only one case of suppurative keratitis after extraction, and that was undeniably due to the unruly behavior of the patient.

The first 50 cases of extraction this year resulted as follows:

Complete successes	36
Secondary cataract, astigmatism, etc. . .	12
Losses	2
	50

Of the second group, however, 7 soon obtained spontaneously or after discision, $S = \frac{1}{6}$. So that we really have these figures:

Complete successes . . .	45	= 90 %
Half successes	3	= 6 %
Failures	2	= 4 %
	50	100 %

There were four cases of prolapse of iris, one of which was not abscised. Two were complicated with secondary cataract. S amounted to $\frac{1}{3}$, later improving of itself to $\frac{6}{18}$;

$\frac{1}{15}$ improving to $\frac{1}{6}$; $\frac{6}{24}$ not seen again; and $\frac{1}{100}$ with secondary cataract to be divided later.

One of the *most important* chapters in any report on the extraction of cataract without iridectomy is the one on *prolapse of the iris.* This accident is indeed a sad occurrence, and one that cannot always be avoided. But the chief question is whether it occurs so frequently and is actually so serious an event as the opponents of the new operation would have us believe. The occurrence of the prolapse is generally followed by pain, which lasts for several hours, and by an irritated condition of the eye, which, however, generally yields in a short time to the application of warm fomentations. The prolapse should be treated as follows: if very small it may safely be left to itself, for it cicatrizes very rapidly, and leaves no trace behind except a trifling degree of astigmatism, which after a period of no great duration disappears, and forever. If the prolapse is of medium size, it *may* be left to itself, but it is on the whole better to abscise it in order sooner to get rid of the astigmatism which it invariably excites. We have abscised the prolapse as early as the eighth day. In about the same length of time the defect is covered over, and the patient can be discharged, so that actually he loses no time in the hospital.

We have not been able to discover that prolapse of iris is always associated with repeated attacks of iritis, or that iritis is more frequent after simple extraction than after extraction with iridectomy. We no longer have any faith, as Schweigger has expressed it, in an "antiphlogistic iridectomy." And more than that, incarceration of the iris and prolapse of the iris is by no means excluded in the extraction with iridectomy, only the piece removed cannot prolapse or become incarcerated.

There were 35 cases of prolapse of the iris (7.9% in 451 extractions), of which number 9 were so minute that they were not touched, the remainder were all abscised. I have not taken the trouble to write to these patients, to inquire after the condition of their eyes, for I long since convinced myself that the opinion of people generally in regard to

their eyes and health is not to be trusted. And more than that, the demands of patients vary exceedingly; some cataract patients are dissatisfied with a subsequent vision of $\frac{6}{9}$. Contrarily, it is interesting and instructive to print the well observed and long-verified histories of patients with prolapse of the iris, for the purpose of demonstrating how eyes thus affected can improve, and remain good, for a length of time.

Case 1.—L. H., teacher; simple extraction April 2, 1887; wedge-shaped knife, upward section embracing one half of the cornea; capsular forceps, easy extraction of lens; eserine. Pain on the next night; bandage changed without inspection of the eye.

April 5th.—A large prolapse of iris embracing one half of the section.

April 16th.—Cocaine and then abscision with scissors.

April 29th.—Slight corneal astigmatism. S = $\frac{6}{24}$ with + $3\frac{1}{2}$.

May 18th.—S = $\frac{6}{12}$ with + $3\frac{1}{2}$. Reads 0.4 with difficulty at 20 *cm* with + $2\frac{1}{4}$.

April 6, 1888.—S = $\frac{6}{9}$ with + $3\frac{1}{2}$.

Case 2.—Mr. C. K., æt. seventy-five. Simple extraction left eye, November 3, 1887. Section downward with 7 *mm* knife; after removal of lens the remnants of sticky cortex demanded the frequent introduction of a spoon, but at last the pupil was clear; eserine; bandage.

Nov. 4th.—Patient complains of pain, slight swelling of lids; atropine between the lids without opening the eye, moist bandage.

Nov. 5th.—Pain; prolapse at inner angle of incision, enlarging day by day despite eserine, and finally abscised Nov. 19th.

Dec. 9th.— + $3\frac{1}{2}$ S = $\frac{6}{18}$.

Jan. 14, 1888.— + $3\frac{1}{4}$ S = $\frac{6}{18}$.

March 6th.— + $3\frac{1}{4}$ S = $\frac{6}{12}$; Sn. 0.4 at 20 *cm*.

Case 3.—Mr. G., æt. sixty-five. June 4, 1889, simple extraction downward, left eye.

June 7th.—Patient out of bed without permission, and hit his head against furniture; large prolapse of iris; eserine used unsuccessfully.

June 14th.—Prolapse abscised.

July 1st.—Discharged. + 4 S = $\frac{1}{12}$: + 4 S ⊃ + c 10 S = $\frac{1}{9}$ and $\frac{1}{8}$ −.

August 4th.— + 4, S = $\frac{6}{24}$.
August 28th.— + 4, S = $\frac{6}{12}$ and $\frac{6}{9}$.
Sept. 10th.— + 4, S = $\frac{6}{9}$. + 2½, Sn. 0.3 at 20 *cm.*
May 26, 1890.— + 4, S = $\frac{6}{9}$.

Other favorable cases of this nature might be cited, but space forbids, and we shall rather here call attention to a case in which an eye with a prolapse was lost two years after the operation.

F. W., an overseer. Simple extraction on the right eye, April 22, 1887; on the third day, broad and extensive prolapse of iris, with iritis and pain. It was not abscised.

May 12th.—Discharged; eye comfortable, considerable astigmatism. S = $\frac{1}{12}$.

About two years later patient returned, reporting that until a week before he had seen well, but since then had suffered with severe pain and loss of sight. At upper corneal margin a large staphyloma of cornea and sclerotic; anterior chamber shallow, and pupil occluded. No perception of light. T + 1.

The eye was at once enucleated, and found full of pus.

Although it is our opinion that an excision of the iris can easily and safely be dispensed with in a large percentage of cases, yet there are *proper indications for the combined method.* In order to determine just what these are, we must determine the causes of prolapse of the iris and test from this point of view the various methods of operating, and after-treatment of extraction.

Injuries after the operation are the most frequent cause of prolapse, and in this class we must include many cases in which the patient will not acknowledge that he has received any injury. But who is to guarantee to us that the patient follows our directions, and rests quietly in bed? Over and over again, patients take advantage of the absence of the nurse, and leave their beds for some secret or fancied reason, in the very act of which, not seeing anything, they easily run against obstacles of various sorts. There are certain patients who will yield neither to argument nor persuasion, and hardly even to force. Thus we had a prolapse of iris in a patient who bent over toward the floor on the second day, after getting out of bed against the strictest orders. He

was warned of his danger, and advised to take the greatest care when he had his second eye operated on. But on the second day after the second operation, we saw him in the darkened chamber, pushing with his thumbs through the bandage into the operated eye so violently that the section was sprung, and the iris prolapsed.

Where better care is taken, and the patients are more reasonable, as in the private clinics, prolapse of the iris is not often observed.

Traumatic prolapse of the iris through the section once already cicatrized is rare after the fourth day, and yet we once saw it in a rather full-blooded woman whilst bending over during a bath on the twelfth day.

Prolapse of the iris may additionally be due to violent efforts at stool after the operation, and for that reason we invariably administer a cathartic on the day before the operation, so as to produce at least one movement of the bowels, whilst afterward we keep the bowels quiet for two or three days, if necessary, with tr. opii.

Generally it is impossible to discover the precise cause of the accident; the operation goes off well, the patient is quiet afterward, and there is no injury. It is exceptional for a prolapse to occur on the first day or within a few hours after the operation. We can discover without inspecting the eye, and merely from what the patient says, that the prolapse is there, that it was accompanied with pain, which, however, disappeared in a few hours. So that in this accident three things are possible: that the prolapse is due to anatomical causes; secondly, to the manner in which the operation is performed; or thirdly, to the treatment of the patient directly after the operation.

1. Prolapse of vitreous is one of the chief anatomical conditions after which prolapse of iris may be expected, therefore wherever this accident is probable, as in high degrees of myopia, fluidity of the vitreous, etc., it is best to perform the combined operation, and remove a portion of the iris.

It is worth observing that the prolapse often occurs in both eyes, and if it has not been caused by the bad behavior

of the patient, there cannot be any better reason than that in decrepit persons the relaxation of the sphincter of the iris mechanically favors the prolapse of the iris, especially when the section is made downward.

For this reason we have often iridectomized the second eye, when, without any apparent reason, there had been a large prolapse in the first eye operated upon without an iridectomy.

It occasionally happens, as in the following cases, that if anything goes wrong, it is imperative to do an iridectomy even after the extraction of the lens.

CASE 1.—R. S., saloon-keeper, æt. sixty-two, diabetic for years, but in fairly good health at present; nuclear cataract, right eye (not diabetic); left eye, S = $\frac{1}{36}$. Extraction, January 4, 1890, right eye. Section downward with broad knife; difficult extraction; some cortical fragments left behind, and removed with spoon. In the latter step the anterior chamber filled with a black emulsion originating from the degenerated iris pigment (Kamocki, these ARCHIVES, vol. xvii., p. 41), and spreading out all over the under surface of the cornea. The introduction of the spoon was followed with slight prolapse of vitreous. Iridectomy performed, and then most of the liquid stroked out of the anterior chamber. Moderate iritis followed; good recovery; slight secondary cataract, S = $\frac{1}{5}$.

CASE 2.—Mrs. K., æt. seventy-five, very decrepit; right cataract, mature; left, immature; S = $\frac{6}{36}$.

May 22d.—Extraction upward with broad knife, and then the iris bulged out and could not be replaced so as to remain. The lens was easily extracted, but even then the iris could not be replaced so as to stay. Broad iridectomy; bandage.

May 23d, although patient had been perfectly quiet and had received no injury, the bandage was full of blood, and again on the following day. The section was also wedged apart with a clot of blood.

June 16th, patient dismissed. S = 0.

This is one of *those excessively rare cases of choroidal hemorrhage after extraction of the lens*, and means of course, that the hemorrhage followed directly upon the completion

of the section, and that it was this which so curiously and so obstinately bulged forward the iris and compelled the iridectomy.

CASE 3.—C. N., a workman, double mature cataract, always myopic, very clumsy, and constantly nips his eyelids together at every attempt to touch them.

March 27th, extraction of the right cataract, constant forcible nipping of the eyelids; lens violently extruded from the eye, the moment that the capsule was divided; vitreous followed. Iridectomy at once. Vitreous opacities at time of discharge. S = ⅓.

2. Now in regard to the second point, the method in which the operation is performed, the question is whether prolapse of the iris is oftener seen after the upward or the downward section. So far as we are concerned, our statistics are of no use at all. For a short time after the section was removed into the lower margin of the cornea, the operations, for the sake of stricter antisepsis, were performed in a more carefully arranged apartment. The patients were then carried down stairs into their rooms. Therefore, if we find an increase of prolapses with the downward section, it may possibly be due to the subsequent removal of the patient.

To quote statistics:

139 cases were operated with the upward section, and there were 8 cases of prolapse of iris, = 6 %.

270 were operated upon with the downward section, and there were 23 prolapses, = 8.5 %.

The last series of 50 cases was operated upon in the patient's room, the bed for the operation standing next to the patient's bed, and the patient in the presence of the physician gently moved across from one to the other. The section was generally made downward, only upward when the patient was very tractable.

It would further be interesting to study whether it is always best to iridectomize whenever after the extraction of the lens the iris is with difficulty replaced, or, in other terms

shows a decided tendency to prolapse. I doubt if the clinical history will support the affirmative side of this assertion, for even when a prolapse has appeared inevitable, it has not always ensued; generally its origin is enveloped in darkness, and when it does appear it is almost always unexpected. Knapp (these Archives, vol. xvii., p. 51) advises an iridectomy wherever there is a tendency to prolapse and it is difficult to replace the iris.

When simple extraction once more came forward for public reception, all operators used eserine more or less. We, too, did not fail to use it after the operation as well as on the evening of the same day. But we soon discovered, to our satisfaction at least, that there was no need of it, and for that reason we have not used it for some time. It does not prevent prolapse of the iris, whilst it undeniably favors the formation of posterior adhesions.

3. Much more care is needed in the first few hours after the new operation than the old, and most operators are agreed in avoiding the least movement of the patient after the extraction of the lens. The patient must be comfortably put to bed, and remain there as quietly as possible for three full days. The bandage is renewed on the second day, but the eye is not to be inspected. After the lids have been carefully cleansed with moist sublimated cotton, atropine is to be dropped into the inner corner of the closed eye, from whence it will easily make its way inward. The eye is not to be opened till the third or fourth day, and from thence onward atropine is to be instilled till the pupil remains of sufficient width.

Considerable complaint has been made of late because the operated eye is not examined for so long a time after the operation, but in reply we ask, *so long as our present therapeutics are of no avail if the section does not recover normally, why inspect the eye at all?*

In reflecting upon the demand that the patients ought to remain in bed three whole days, we must remember in cases of senile marasmus, asthma, emphysema of the lungs, etc., where the patient cannot lie so long recumbent, that the combined operation would better be performed.

RÉSUMÉ OF STATISTICS OF OPERATIONS AT PROF. SCHWEIGGER'S CLINIC.

1.—122 cases with capsular forceps gave:

Successes	89	= 72.9 %
Secondary cataracts	27	= 22.2 %
Losses	6	= 4.9 %
	122	100 %

2.—90 cases with puncture of the vitreous body gave:

Successes	57	= 63.4 %
Secondary cataract	25	= 27.8 %
Losses	8	= 8.8 %
	90	100 %

3.—159 cases with peripheral division of the capsule gave:

Successes	132	= 83 %
Secondary cataract	18	= 12 %
Losses	8	= 5 %
	159	100 %

Or, to sum up, 371 cases of extraction *with* iridectomy, with these results:

Successes	278	= 75.1 %
Secondary cataract	71	= 19.2 %
Losses	22	= 5.7 %
	371	100 %

Now our statistics of the *simple extraction* embrace 450 cases, resulting as follows:

Successes	346	= 76.5 %
Secondary cataract	84	= 19.1 %
Losses	20	= 4.4 %
	450	100 %

It was not our intention in this article to construct brilliant statistical tables (the terms success, secondary cataract, and loss, are flexible ideas), but to compare the results, in *the same clinic*, of the simple and the combined methods of cataract extraction. But the latter series of figures demonstrate that neither secondary cataract nor losses have

increased since we have followed simple extraction of senile cataract. Q. E. D.

SUPPLEMENTARY REMARKS.

We have endeavored in the previous pages to exhibit the indications for the performance of iridectomy in the extraction of senile cataract, and any one can see that it is by no means our intention to make it "a principle to abandon the excision of the iris." On the contrary, there lies the essence of our remarks, that we are learning how to distinguish the cases which are better suited for simple extraction, and those in which the iridectomy is preferable. And that by further observations, as well as by the communications of other operators, we shall be enabled to decide with sufficient certainty when and how often to perform the simple extraction, so that we shall then be enabled to perform it with greater security and greater success. Therefore I deem it proper here to state in what proportion in this hospital the simple extraction stands to the combined.

When simple extraction was again resumed, we at first operated only upon those cases which seemed especially favorable; most were operated upon with an iridectomy. But later, encouraged by our excellent results, we operated on every normal case—that is to say, in the majority of cases, without the iridectomy. In other words, at various intervals between the performance of our last 400 simple extractions, we have performed 65 extractions with an iridectomy.

ON THE PROPOSED METHODS FOR NUMBERING PRISMS.

By A. DUANE, M.D., New York.

A.—MINIMUM DEVIATION.

THE proposition that prisms should be numbered according to their angle of minimum deviation instead of their refracting angle, while apparently satisfactory from a scientific point of view, is yet open to at least one objection on the score of scientific accuracy. This objection is that in practical ophthalmological work prisms are almost never placed in such a position as to produce minimum deviation. In the ordinary trial-frame, for example, a prism is placed with either its posterior or its anterior face perpendicular to the incident ray. The former (postero-normal) position is assumed when the prism is slipped into the front clip of the frame; the latter (antero-normal) position is assumed when the prism is placed in the back clip. The position of minimum deviation is never assumed. Moreover, even if one prism could be placed in the latter position, a series of superimposed prisms, such as are employed in testing or exercising the adductive power of the eye, could not be thus disposed. While these considerations invalidate to some extent the scientific advantages claimed for the proposed change, it remains to be seen whether the difference between the values of the deviation produced in the three different positions of the prism is sufficiently great to be of practical moment. In order to determine this, I have calculated the following

table representing the value of the deviating angle in these three positions. The index of refraction is assumed as 1.54.

Refracting-Angle of Prism.	Angle of Deviation in		
	Position of Minimum Deviation.	Postero-normal Position.	Antero-normal Position.
1°	0.5	0.5	0.5
2°	1.1	1.1	1.1
3°	1.6	1.6	1.6
4°	2.2	2.2	2.2
5°	2.7	2.7	2.7
6°	3.2	3.2	3.3
7°	3.8	3.8	3.8
8°	4.3	4.3	4.4
9°	4.9	4.9	5.0
10°	5.4	5.4	5.5
11°	6.0	6.0	6.1
12°	6.5	6.5	6.7
15°	8.2	8.2	8.5
20°	11.0	11.1	11.8
25°	13.9	14.0	15.6
30°	17.0	17.2	20.4
35°	20.1	22.1	27.1
40°	23.6	24.7	41.8

The facts to be deduced from this table are as follows:

1. Prismatic numeration according to the angle of minimum deviation is sufficiently accurate when a single prism is used, as we ordinarily employ no prism with refracting angle greater than 20°, and up to this limit the deviation produced is practically the the same in all positions.

2. When, however, as in testing the adductive capacity, an aggregation of prisms, whose collective refracting angle exceeds 20°, is employed, the resulting deviation will be more than the sum of the individual deviations produced by the component prisms, and must be computed by referring once more to the refracting angles of the latter. Thus, if two prisms having respectively deviating angles of 8° and of 11° are placed before one eye in the front clip of the trial frame, the resulting deviation will not be 19°, but, since the prisms have respectively refracting angles of 15° (nearly) and 20°, will be the deviation produced by a prism of 35° refracting-angle placed in the postero-normal position, or will be 22°.

3. When an object viewed through a converging prism arranged in the postero-normal position, is approached to the eye, the incident ray is no longer normal to the posterior face but becomes more and more nearly normal to the anterior face of the prism, *i. e.*, the prism is more nearly in the antero-normal position. Hence the deviation produced by the prism, although its position remains the same, is greater in proportion as the object approaches the eye; and when an aggregation of prisms of total refracting angle in excess of 20° is employed and the object is brought very near the eye, as in testing the absolute maximum of convergence [Maddox], the true convergence would be quite a little in excess of that calculated upon the assumption that the prism has remained in the postero-normal position, and still more in excess of the value deduced from the minimum deviating power of the prism.

No system of prismatic numeration is altogether satisfactory, since, whatever system we follow, the number that we assign to any given prism holds good for but one position of it, and represents a value which is constantly varying with the variations in the relative places of the prism and the objects viewed through it. For prisms of very oblique refracting angles, it is true, this variation is slight and can be disregarded, and hence for all prisms which have a deviating angle of less than 10°, and especially for all prisms used in occulists' prescriptions, the new system is sufficiently accurate and, as it is preferable on other grounds, should doubtless be adopted. But in all experiments with abduction and adduction where we are constantly called upon to use prisms of higher power, the new system is not only scientifically inaccurate but is also inconvenient. For, as the example above given shows, it is not possible to determine directly from the individual deviating angles of a series of superimposed prisms the deviating angle of the series as a whole; while, if the prisms are numbered according to their refracting angles, the summation of a series of prisms is effected at once and without calculation. If, for example, we have superimposed in the trial frame a series of prisms, whose refracting angles taken all together amount to 40°, the devi-

ating effect of such a series will be the same no matter how the prisms composing the series vary in strength and number. In other words, p. 40° = p. 15° + p. 25° = p. 1° + p. 2° + p. 3° + p. 4° + p. 5° + p. 6° + p. 7° + p. 12°, and so on indefinitely. But, if the prisms were numbered according to their deviating angles, the first expression would become p. 23.6° (d), the second p. 8.2° (d), and p. 13.9° (d), the sum of which would be 22.1° (d); and the aggregate of the component deviating angles of the third expression would be 21.6° (d). And the actual deviation produced by such an aggregation (no matter of what prisms composed) would be 24.7°, if, as would almost always happen, it was placed in the postero-normal position. Hence, to determine the deviation produced by a series of prisms when the refracting angles are given, we have only to add together the refracting angles and find the deviation produced by a prism whose refracting angle is equal to this sum; but, if the prisms are numbered according to their deviating angles, we have to first ascertain the refracting angle of each and then perform the addition. Accordingly, in all problems involving the use of several prisms together, and particularly in testing and exercising adduction and abduction, the old system is much more convenient than the new; and it becomes a question how far the advantages arising from the introduction of the new system in the case of weak prisms would be counterbalanced by the disadvantages due to its use in the class of cases just described. In fact, it may well be asked whether it is worth while to supersede a system already well established by a new one which is not in all respects its superior either in accuracy or in convenience.

B.—METRE-ANGLES AND PRISM-DIOPTRIES.

If numeration according to the angle of minimum deviation is not perfectly satisfactory, the proposed systems of measurement by prism-dioptries and metre-angles are still less so. In the former system, in which prisms are numbered according to the tangent of their deviating angle, the additional complication is introduced that, as the tangents increase faster than their angles, the amount of deviation as meas-

ured by prism-dioptries is too great. 40 P. D., for example, denote an angle of deviation less than forty times that produced by 1 P. D.[1] Nor does there seem any advantage, but rather the reverse in substituting a linear for a circular equivalent of the value of an angle.

As regards the metre-angle the case seems even worse. For, not only is the metre-angle a variable quantity, ranging between the limits of $1\frac{1}{2}°$ and 2° according to the interpupillary distance, but further, with the higher multiples of the metre-angle, the angle of convergence is not exactly proportional to the nearness of the point of convergence to the eyes. The metre-angle, for instance, for an inter-pupillary distance of 60 *mm* is 1° 43′—*i. e.*, this is half the angle of convergence of the optic axes at the distance of one meter. But 15 m.-a. representing a convergence of the optic axes of $51\frac{1}{2}°$, corresponds to a point of convergence of the optic axes, situated not at 66.7 *mm* ($=\frac{1}{15}$ metre) but at 62.1 *mm*. Nor is this all. This lack of correspondence between the angle of convergence and the distance from the eye of the point of intersection of the converging optical axes, is itself irregular, being different for each inter-pupillary distance. Thus for an inter-pupillary distance of 60 *mm*, 15 m.-a. correspond to a distance of 62.1 *mm* of the point of convergence; for an inter-pupillary distance of 70 *mm*, they correspond to a distance from the eye of 60.5 *mm*. The expression 15 m.-a., therefore, means not only a degree of convergence varying with each eye, but also means a point of convergence situated at varying distances from the eye. To number prisms according to a value so indeterminate seems surely most unwise.

NOTE.—Although not strictly belonging to this subject, it may not be amiss to note here an error which, doubtless through inadvertence, has crept into Maddox's book on "Prisms" and which has been copied in Prentice's article on "The Prism-Dioptry" (ARCH. OF OPHTHALM., xix., 2 and 3, p. 128). In treating of the composition and resolution of prisms, Maddox gives the formula:

$$(1.)\quad \text{Sin. } x = \text{Sin. } \triangle \text{ Sin. } r,$$

[1] The exact values are: 1 P. D. = 34′ 22.8″, hence 40 × 1 P. D. = 22° 55′; but 40 P. D. = angle corresponding to a deflection of 40 cent. at 1 metre = 21° 48′.

where x is the lateral displacement produced by a prism of deviating angle Δ, which is rotated through an angle r from the vertical. Further, for the angle of deviation R of the prism representing the resultant of a vertical prism of deviating angle V and a horizontal prism of deviating angle H, he gives the formulæ:

$$(2.)\ \text{Sin. R} = \sqrt{\text{Sin.}^2\,\text{V} + \text{Sin.}^2\,\text{H}},$$

and

$$(3.)\ \text{Sin. } r = \frac{\text{Sin. H}}{\text{Sin. R}}.$$

Here r is again the angle which the axis of the resultant prism makes with the vertical. Here a little consideration of the trigonometrical principles involved will show that these formulæ should read as follows:

$$(1.)\ \text{Tan. } x = \text{Tan. } \Delta\ \text{Sin. } r.$$

$$(2.)\ \text{Tan. R} = \sqrt{\text{Tan.}^2\,\text{H} + \text{Tan.}^2\,\text{V}.}$$

and

$$(3.)\ \text{Sin. } r = \frac{\text{Tan. H}}{\text{Tan. R}}.$$

This error, however, is of no practical importance, since for angles, such as are here under consideration (viz., those less than 10°), the sine, tangent, and arc may without sensible error be taken as identical. Indeed, these formulæ may as well be written (by substituting arc for tangent) in the simpler forms:

$$(1.)\ x = \Delta\ \text{Sin. } r, \text{ and } y = \Delta\ \text{Cos. } r,$$

(where y represents the vertical displacement produced by the inclined prism, just as x represents the lateral displacement).

$$(2.)\ \text{R} = \sqrt{\text{V}^2 + \text{H}^2}.$$

$$(3.)\ \text{Sin. } r = \frac{\text{H}}{\text{R}}.$$

By the aid of the first of these simplified formulæ, I have been for some time in the habit of calculating the respective horizontal and vertical deviations produced by a revolving prism employed for testing vertical and lateral insufficiencies.

TEMPORARY EXOPHTHALMOS AND OPHTHALMOPLEGIA EXTERNA FOLLOWING GRIP.[1]

By PETER A. CALLAN, M.D.

Bernard F. B., aged 44, native of United States, came to my clinic at the N. Y. Eye and Ear Infirmary, January 10, 1890, on account of the extreme protrusion of both his eyes. Until within the last three weeks his health had been good, and most of his life had been spent at sea, as steward in the service of the Pacific Mail S. S. Co. During the past year he was storekeeper for the Phœnix Construction Company. He was a man of intemperate habits, and of a very nervous, excitable disposition.

He had an attack of the grip beginning Christmas, 1889; but, with the exception of two days, this did not prevent his attending to his regular duties as storekeeper. The attack left him very weak, and harassed by an annoying cough. January 7, 1890, two weeks from the onset of the grip, he began to suffer from a most unbearable headache, which having lasted twelve hours, the right eye "began to bulge out of its socket" (to quote his words), and in about twenty-four hours the left commenced to similarly protrude. For about thirty-six hours his suffering from his head and cough became so severe that friends watched him closely fearing he might commit suicide.

When both eyes became exophthalmic, his headache diminished very much in severity; and when admitted as a patient, January 10th, had almost disappeared.

Patient was fair, about medium height, and full habit, weighing, I should judge, about one hundred and eighty pounds. Temperature, when admitted at 3 P.M., was 102°; pulse, 120. Owing to his condition, vision not taken. Both eyes were extremely

[1] Read before the Ophthalmic Section of the N. Y. Academy of Medicine, February, 1890.

prominent and immobile, with chemosis below, reaching almost the level of lower eyelids. Pupils moderately dilated.

Ophthalmoscope showed nothing characteristic. Slight blur of optic nerve outline, with tortuous veins on each retina. Patient was put to bed, a saline cathartic given, and leeches applied to his temples; 10 P.M. of same day, temperature 104°, mild delirium. For twenty-four hours after admission there was not any marked change in the general condition of the patient, except with regard to the exophthalmos. The saline cathartic operated very freely in due time, and apparently as a result there was marked diminution in the amount of eye protrusion. The eyelids could be readily shut, which was impossible on the day of admission, and the eyeballs could be moved to a considerable extent. Patient's condition grew worse, and on second day, temp., 105°; pulse, 130; pupils became contracted; delirium more pronounced; and he sank into a comatose state, and died January 13th, at 9 A.M., as if from apoplexy.

A few hours prior to death, the exophthalmos practically disappeared, but the chemosis remained in part. At 2.30 P.M. of same day, **autopsy** by Drs. Harvey and Gibson, of the house staff. On removing the calvarium, the meninges were found adherent to the cerebrum, and very dark in color. Between the dura and pia mater, covering the optic groove, olivary process, sella turcica, and extending laterally over both sphenoidal fissures, there was found a circumscribed sac of serous fluid holding between three and four drachms of serous fluid. The optic nerves in their passage into the orbits were found flattened in the foramina, and fluid escaped from orbits. In the lateral ventricles, especially the right, there was found considerable serous fluid. In removing the brain, an unusual amount of fluid escaped.

The case is unique, on account of the transitory character of the exophthalmos and the cause. The patient had originally a strong physical constitution, which the abuse of alcohol had impaired. The harassing cough which resulted from the grip tended to keep the brain capillaries congested, and, owing to impoverished condition of the blood, diapedesis took place—serous effusion. The most extraordinary feature was the sacculated bag of fluid which tightly compressed the sphenoidal fissures and optic foramina, causing ophthalmoplegia externa and exophthalmos of both eyes, both conditions disappearing before patient's death.

A CASE OF DISSEMINATED SCLEROSIS, PRESENTING THE CLINICAL ASPECT OF PRIMARY SPASTIC PARAPLEGIA, WITH ATROPHY OF BOTH OPTIC NERVES.

By Dr. CHARLES ZIMMERMANN, Milwaukee, Wis.

THE frequency of ocular symptoms in disseminated (insular) sclerosis is a well-established fact, and, from the observations of Charcot, Erb, Leyden, and Pitres, we know that primary spastic paraplegia may be the incipient stage of disseminated sclerosis, but, in regard to the occurrence of affections of the ocular nerves, especially the optic nerve, in primary spastic paraplegia and their diagnostic value, literature gives very little information. Erb, in his first publication on primary spastic paraplegia (*Berliner klinische Wochenschrift*, 1875, p. 358), says: "No cerebral nerves and no cerebral functions are altered in any way." Gnauck (On Eye-Affections in Disseminated Sclerosis, *Berl. klin. Wochenschrift*, 1884, p. 421) mentions five cases of primary spastic paraplegia, in which ocular disturbances never occurred. Gowers, 1886 ("Primary Spastic Paraplegia" in "Diseases of the Nervous System," vol. i., p. 333): "Ocular symptoms are extremely rare. The action of the pupils is usually perfect, and I have only once seen optic-nerve atrophy in an uncomplicated case." In the third edition of his "Medical Ophthalmoscopy," of 1890, he says, under the heading, "Lateral Sclerosis": "Ophthalmoscopic changes are very rare in cases which present the symptoms of primary lateral sclerosis of the cord. In one or two cases, however, I have seen gray atrophy slowly supervene, similar in character to that met with in locomotor ataxy."

Peltesohn (*Centralblatt für prakt. Augenheilkunde*, 1886, p. 106): As great a rarity is furnished by a "case of primary spastic paraplegia with atrophy of both optic nerves in a syphilitic patient." "In my whole literary search I find only one analogous case, but only apparently: Suckling (*Brit. Med. Jour.*, 1882, p. 769) publishes a case of lateral sclerosis in a man of twenty-seven years of age, suffering from optic neuritis in one eye, iritis in the other, of syphilitic origin. An uncomplicated simple atrophy of the optic nerve in lateral sclerosis did not come under my observation." Vossius (*Grundriss der Augenheilkunde*, 1888, p. 363: "Uncomplicated atrophy of the optic nerve is very much rarer in spastic tabes than in locomotor ataxy." Michel ("Lehrbuch der Augenheilkunde," ii. Aufl., 1890, p. 518) mentions the occurrence of atrophy of the optic nerve in primary spastic paraplegia, and that its propagation on anatomical paths was supposed (through the corpora restiformia, the lower portion of the pons, the pes, the white substance, the thalami optici, and the capsula interna to the tracts). Oppenheim ("Zur Pathologie der disseminirten Sclerose," *Berl. klin. Woch.*, 1887, p. 904) was the first to devote a special investigation to this subject, giving it its due importance. He found in 11, out of 20 cases of primary spastic paraplegia of his own observation (*i. e.*, in more than 50 per cent.) a pathological condition of the optic nerve, and in the post-mortem examinations of 5 cases sclerotic foci in the optic nerve, chiasma, and optic tract. He calls attention to the fact that *disseminated sclerosis presents much more frequently than is generally supposed the clinical features of primary spastic paraplegia*, and that *one symptom*, which has to be looked for, the *affection of the optic nerve* ("described with special precision and completeness by Uhthoff and Gnauck"), *may insure the diagnosis*. He asserts that primary spastic paraplegia, with simultaneous affection of the optic nerve is not an unfrequent clinical form of disseminated sclerosis.

Recognizing the importance of Oppenheim's observations, and considering the scarcity of publications on this subject (Bruns reports a similar case, *Berl. klin. Woch.*, 1888, p. 90),

I think it will be of sufficient interest to describe the following case, in which the atrophy of both optic nerves, with the predominating clinical appearance of primary spastic paraplegia, guided me to the diagnosis of disseminated sclerosis.

W. F., painter, twenty-six years old, came under my observation on November 27, 1886. He complained of dimness of sight in right eye for about eight weeks and of diplopia. V, R $= \frac{1}{15}$; V, L = 1. Field of vision and perception of colors normal. Both pupils equal, reacting perfectly normal upon light. The ophthalmoscopic examination revealed the *temporal two thirds of both optic discs perfectly white*, all the vessels being crowded to the normally colored nasal third. He had *crossed diplopia*, commencing on the median line and more noticeably on the left side, the distance of the double images becoming greater when looking to the left, from a *paresis of right internal rectus*. Under the use of iodide of potassium and subcutaneous injections of nitrate of strychnia his sight improved, so that when I saw him last, on January 31, 1887, V in both eyes was = 1, and diplopia had disappeared. *But the ophthalmoscope showed the same atrophic condition of the temporal two thirds of both optic discs*, as at the first examination. He resumed his business as a painter, and a few months later, through some of his friends, I heard that he was not troubled any more with his eyes.

On March 9, 1891, he came again to my office, sent by his family physician. He did not complain about his eyes, but I at once noticed from his peculiar gait that he must have an affection of his nervous system, remembering at the same time the atrophy of his optic nerves. Upon closer examination I found all the *symptoms of primary spastic paraplegia*, with some complications, which led me to the diagnosis of *disseminated sclerosis*. But, before I go into the description of the case, I give the previous history of the same, which may throw some light on the etiology, as well as it may corroborate the assertion of some authors (Oppenheim, Bruns), that the causes and the incipient stages of primary spastic paraplegia and of disseminated sclerosis may be traced as far back as the earliest childhood.

History: Both parents of the patient and two brothers are living and healthy. There is no inherited neuropathic tendency in his family. Except measles no acute infectious disease. According to his mother's statement, he has been stammering since his fifth year, getting worse when excited. In school it was sometimes so bad that he hardly could read. When he wanted to pronounce a word commencing with the letter "d" he could not get it, unless he began reciting the alphabet and uttering "a, b, c," then he could say "d." At the age of eight years he fell from a tree on his back without apparent injury, and when nineteen years old he suffered a severe exposure to cold by breaking through the ice while hunting, being wet all over for several hours. About that time he noticed sometimes a certain awkwardness in his movements—for instance, when in dancing-school he had danced a few dances as well to the right as to the left; he could not any more turn to the left, only to the right. In April, 1887 (soon after he had been under my treatment for his ocular affections), he had occasionally peculiar sensations of numbness and tingling in his right arm; it felt as if asleep. Then he lost the power in this arm, so that he hardly could lift anything for about seven months. Gradually, without any medication, his arm got better, and he thinks that it is as powerful now as it ever was. About a year or two later he gradually experienced the same symptoms at first in his right and then in his left leg. He felt a numbness and weakness in both, so that he got tired more readily than before; his legs felt heavy. Formerly he could walk twelve and sixteen miles, now he got tired when he walked about a mile. Now and then he had paroxysms of painful spasm in the muscles of the calf and the posterior muscles of the thigh. He had to rub his limbs in order to relieve the spasm. The left leg grew better, but not the right. After a further year (about a year ago) his arms, especially his right arm, which in the meantime had been well, again were invaded by the same progressive weakness and the peculiar sensory symptoms. Last January he commenced to feel weak around his abdomen and back, as if these parts were dead, but he had no pain in them. At the same time the sphincters became affected. He has no incontinentia, but a certain weakness, so that if he does not at once follow the calls of nature he is not able to resist them.

I examined the patient on March 9 and 10, 1891, and found the following condition:

Status Præsens.—The patient is a healthy-looking, tall, slender-built man (he says that he lost flesh—about fourteen pounds last winter). No exanthemata, no swellings of glands, no signs of lues. No intoxication with alcohol, tobacco, or lead. His muscles are not wasted, and there is no difference in the circumference of the corresponding limbs. His gait is characteristic of primary spastic paraplegia; the right leg seems to drag behind the patient, and is hauled forward as a rigid whole, not being bent in the knee-joint, its great toe catching against the floor. (Gowers). He wears off his right shoe at the inside of the toe. Standing with closed eyes he has no tendency to fall over. On first rising in the morning he can walk very well, but after about fifteen minutes it gets worse, his legs feeling weaker then. In the flexor muscles of the hip in both legs, but especially in the right, there is a distinct loss of power, so that the thigh can only be lifted a very little height and cannot be brought into horizontal position while the patient is standing. When sitting, he cannot bring one leg over the other; if he wishes to do this he must do it with his hands. The same weakness is observable in the flexors of the knee and the foot. Rotation of the foot cannot be effected. The tendon-reflexes are very much increased and excessive. The slightest tapping of the tendon of the quadriceps femoris causes several excessive and quick knee-jerks, and ankle-clonus is readily obtained. When the patient sits with the great toe resting on the ground, his leg commences to shake violently until he stretches it out. There is spasmodic stiffness in the leg, so that the knee can be passively flexed only by some force applied to it. He has paroxysms of trembling and spasm, which are brought about mostly by changes of temperature. When, after retiring, the bed gets warm he feels a tickling in his legs, which commence to shake and to tremble, then they become rigid and are extended ("clasp-knife rigidity"). At the same time he feels a painful cramp in his calf, which will be relieved when the extension of the limb is completed. His wife stated that she noticed twitching of his muscles while he was asleep (paroxysms of clonic spasm). Otherwise his sleep is good and not disturbed in the least. There is also a spastic rigidity in his abdominal muscles. When he bends the trunk to one side he cannot recover his position, but has to get hold of a table or his leg in order to raise his body. The right arm is affected in a similar way, but less in degree. There is weakness and dimin-

ished power in it and numb feeling in his fingers. On March 10th he felt for the first time contractions of the flexor muscles of his right forearm. The myotatic irritability becomes manifest by the excessive tendon reflexes on tapping the tendons of biceps, triceps, and flexor digitorum communis just below the wrist. The left arm is almost normal. No increased chin-reflex. Besides the subjective sensations of numbness and formication there is a defect of sensibility at the right forearm and hand. Commencing 2 *cm* above the olecranon the skin of the right arm is perfectly anæsthetic to the prick of a pin, extending over an area 7 *cm* long and 5 *cm* wide, starting from the internal condyle. The whole surface supplied by the ulnar nerve, except the dorsal portion of the fingers and the hand, shows impaired sensibility. He feels a stiffness in his fourth and fifth fingers and the corresponding volar portion of the hand; it does not open and shut as it ought. Of the skin-reflexes the cremaster-reflex is diminished. He is unable to attend to his business as a painter, his right arm becoming tired of holding the brush, and the condition of his legs preventing him from climbing and standing on ladders and scaffoldings on account of the spasmodic rigidity of their muscles. His speech is hasty, one word overlapping the other when he is excited. It is not what has been termed "staccato or scanning utterance" (scandirende Sprache). Since January, 1887, no functional disturbances of the visual organ. No diplopia, no nystagmus. The action of the pupils is perfect. V in each eye = 1. He reads the whole day without inconvenience. No scotomata, visual field and color perception normal. But the temporal two thirds of both optic discs are just as white from atrophy as when first examined in November, 1886. The other senses normal.

In regard to mental symptoms (he is somewhat irritable) an undue contentment exists, which is distinctly unnatural, considering his inability to work for over a year. No headache, no vertigo. Memory good. Before falling asleep he frequently experiences visual hallucinations (he sees in the dark: clouds, gardens, frescoed rooms, horses, etc.). He has a very good appetite, no difficulty in swallowing, nor any other bulbar nerve-symptoms. Urine free from albumen and sugar. His sexual power is remaining (he is married and has a child six months old).

The chief symptoms of this case: weakness, myotatic irritability, spasms and their gradual onset, constitute the clini-

cal features of *primary spastic paraplegia* (primary lateral sclerosis). *Why then is this a case of disseminated sclerosis,* which I asserted it was? The *reasons* which led me to this diagnosis will at once become apparent when we *analyze* the *complications* which *our clinical history* contains. The most important of all is the *partial atrophy of both optic nerves;* the development and the appearance of atrophy in this case are characteristic of disseminated sclerosis; the sudden onset of amblyopia (in one eye) and the speedy recovery of sight; the partial atrophy, affecting only the temporal two thirds, and its rapid development; the lasting ophthalmoscopic appearance of atrophy with amelioration of vision to its normal acuteness, and the discrepancy between the ophthalmoscopic condition and the perfect performance of the function of the optic nerves; its early appearance before any other symptom could be observed. Uhthoff found this in four cases ("Untersuchungen über die bei der multiplen Hirnsclerose vorkommenden Augenstörungen") and Gnauck in case "Hayman" (*Berl. klin. Woch.*, 1884, p. 421). It was only about eight weeks before my first examination that the patient complained of failure of sight, and then his optic nerves were atrophic and have remained so ever since, the vision returning to its normal condition in about one month. An explanation of this peculiar course of atrophy of the optic nerve was first given by Uhthoff (*Berl. klin. Wochenschr.*, 1885, p. 245), who proved, from three cases of his own and four cases of Gnauck (*l. c.*)—*i. e.*, about 25 per cent. of the cases of disseminated sclerosis with ophthalmoscopic changes, that the *atrophy was of neuritic origin.* In disseminated sclerosis the optic neuritis turns very rapidly into atrophy, so that the patients very often come under our observation when the pathological changes of the optic nerve have already taken place, and then it is usually impossible to recognize the neuritic origin from the condition they present. Ch. Achard and Louis Gunion (*Arch. de Méd. Expérim. et d'Anat. Pathol.*, 1889, No. 5; abstract in *Brain*, part iii., 1890, p. 430), in a paper on "acute disseminated myelitis with double optic neuritis," described a case in which "spastic symptoms developed and sight was restored

to a certain extent from blindness, which had come on in the course of six days. The patient died of acute phthisis. On subsequent examination three large patches of sclerotic change were found—one in the upper cervical region of the cord, another in the dorsal region, and a third in the optic nerves and tracts. In connection with these, secondary degeneration had taken place. Achard and Gunion, however, do not venture to come to any conclusion as to the nature of their case."

Very likely our patient had at first optic neuritis, which may have changed very early into atrophy in the period of eight weeks, or even less, so that when he came to the first examination the inflammation had subsided for some time, and the improvement of sight had already commenced. Uhthoff found as the cause of this retrobulbar neuritis sclerotic changes in the optic nerve (Untersuchungen, etc.). The medullary sheath of the nerve fibres becomes atrophic from proliferation of connective tissue in the septa, but the *axis-cylinders mostly remain unimpaired.* This is evidently the reason that the sight may return to its normal state, and that *very often no visual disturbances are complained of, where only the ophthalmoscopic examination reveals the atrophy.* Cases of this kind are mentioned by Oppenheim (*l. c.*). That the *atrophy* is confined to the *temporal two thirds*, as in our case, or the temporal halves, is *quite common* (Charcot, Gnauck, Uhthoff, Oppenheim), and even if the nasal half becomes also affected, the temporal portion shows the changes more markedly (Gnauck, *l. c.*).

According to Oppenheim, the atrophy of the optic nerves, with the symptoms of primary spastic paraplegia, would be sufficient to justify the diagnosis of disseminated sclerosis. But in order to complete our investigation we have to consider some other symptoms, presented by our case, which will help to support our diagnosis. The patient complained of *diplopia*, due to a *paresis of the right internal rectus* from an affection of a branch of the right oculomotor nerve. It seems most probable to assume that this paresis was caused by the development of a *sclerotic patch* at one of the *nuclei* of the third nerve, only affecting the branch which supplies the

internal rectus as long as the incipient sclerotic process was irritating it by the inflammatory proliferation of connective-tissue elements of neuroglia. As soon as a shrinkage followed and the pressure ceased, which the inflammatory swelling had effected, the persistence of the axis-cylinders (characteristic of sclerosis) admitted of a perfect functional recovery. Affection of the ocular nerves with double vision is quite a frequent lasting or transitory symptom of disseminated sclerosis, and very often one of the first. Charcot observed disturbances of the ocular nerves as an inaugurating sign of the disease. Uhthoff (Untersuchungen, etc., *l. c.*) found paralysis of the ocular nerves, mostly abducens and oculomotor nerve (the former twice as much as the latter), in 17 per cent., *half of them* of decidedly *nuclear* character. In some of his cases the paresis was the *initial* symptom of the disease. He also (*Berl. klin. Wochensch. l. c.*) observed a case of *partial paralysis* of the left oculomotor nerve in a case where the levator palpebræ superioris and the superior rectus were affected. Bernhardt (Gehirnkrankheiten, "Real-Encyclopædie der gesammten Heilwissenschaft," von Eulenburg, ii. Aufl., Bd. viii., p. 99) says of the paresis of ocular nerves in disseminated sclerosis: "This affection is either central in the nuclear region, or a partial gray degeneration of single peripheral ocular nerves." But according to Mauthner ("Die Nuclearlaehmung der Augenmuskeln," p. 373, 1885), "the often slight ocular paralysis, preceding disseminated sclerosis is entirely a *nuclear* one, as we can now pronounce with certainty." Gowers ("Diseases of the Nervous System," vol. ii.) says: "In some cases there is increasing palsy of one of the ocular nerves, due to the development of sclerosis in the nerve trunk." The affection of the right oculomotor nerve in our case has all the remarkable clinical features observed in disseminated sclerosis; it is *partial*, *transient* and an *initial symptom*. Another complication deserves our attention: the *sensibility*. Oppenheim (*l. c.*) lays great stress upon its diagnostic value in disseminated sclerosis, and advises us to search for its disturbances in the course of our observation. Remak ("Eulenburg's Encylopædie," ii. Aufl., xvii. Bd., p. 475) considers alterations of sensibility in primary spastic

paraplegia always indicative of some graver affection, *i. e.*, mostly disseminated sclerosis. Our case shows a form of *anæsthesia, confined to a small district* of the right forearm, which is most common in disseminated sclerosis according to Gowers' description, who says, "that the loss of sensibility is more often partial, involving only a small area of a limb, and it may or may not correspond to the motor palsy." Besides this limitation to a small area it has a *fugitive* character, and is changing in our case. Although it was sought for, it was not found until March 13, 1891, and on March 25th it had changed in its extent and degree. This *acute development* and its *transitory character* are *pathognomonic* of disseminated sclerosis, as pointed out by Oppenheim (*l. c.*), who claims that he has not seen this in any other disease. The analgesia in syringo-myelia may have some resemblance to it, as it may also occupy exclusively certain zones of skin and mucous surfaces (*vide* Blocq in "*Brain*," part iii., 1890). The *early* appearance of *weakness* and *myotatic irritability* in the *arms*, especially the right arm, would be rather a symptom of incipient disseminated sclerosis, than of primary spastic paraplegia, according to Remak (*l. c.*), although in the latter the arms suffer in some cases in a similar manner as the legs. The weakness of the *sphincters*, as in our case, is a symptom, observed in both diseases, disseminated sclerosis and primary spastic paraplegia, but its rather sudden onset, in a quasi-apoplectic form last January, seems to indicate disseminated sclerosis. It may last weeks and months, and then disappear for a time. Although the *articulation* of our patient is hasty and hurried, and not of the well-known scanning character, we have to mention it as perhaps connected with the disease in view, since Bernhardt (*l. c.*) describes a case which showed the same hasty and precipitate *speech* at the very beginning of disseminated sclerosis, and Oppenheim (*l. c.*) observed cases in which patients, who exhibited the symptoms of disseminated sclerosis in the second and third decennia having developed them in the last years, recollected that their speech had been affected *since infancy*. In our case it was noticed in the patient's fifth year. Our patient's *undue contentment* with his

unfortunate condition and the irritability of his disposition may be added here as further signs common in disseminated sclerosis.

Reviewing once more the complications of the clinical features of primary spastic paraplegia, exhibited by our case, they all seem of inferior importance in comparison with the affection of the *optic nerves*, which was the first, the only lasting, and the most objective of all. We learn from our case, *that atrophy of the optic nerve, when associated with the symptoms of primary spastic paraplegia, is the most valuable and reliable guide in the diagnosis of disseminated sclerosis.* When observed early, before any striking appearance of other symptoms, its peculiarities (set forth above) will give us a hint to be on the lookout for other signs, even in their most primary stages, thus enabling us to make an early and distinct diagnosis.

PUNCTURED WOUNDS OF THE EYE IN CHILDREN.

By W. E. BAXTER, M.D.,

SURGEON TO THE EASTERN MAINE EYE AND EAR INFIRMARY, OPHTHALMIC AND AURAL SURGEON TO THE HOME FOR AGED WOMEN, BANGOR, MAINE.

IT is frequently observed in the practice of medicine that diseases and accidents, especially of the more unusual forms, seem to run in streaks, as it were; and the following four cases of punctured wounds of the eye, all happening to children under ten years of age, and all occurring in a city of twenty thousand inhabitants, within the space of a month, help to bear out this observation.

The greater liability in children under the age of puberty to develop sympathetic ophthalmitis is well known; and in two of these cases, Nos. 1 and 3, this liability is illustrated. These four cases, while not numerous enough to become of value in themselves as statistics, show the marked tendency towards sympathetic troubles in children. The deformity resulting from the removal of an eye in young children, due to the lack of development in the side of the face from which the eye has been removed, as well as the disfigurement resulting from the loss of the eye itself, is to be mentioned to the parents of the children, but neither of these results should be considered when the sight of the child is in danger, as I judge it to be if an immediate enucleation is not done, unless the case can be under the direct charge of one who will watch for and place the proper interpretation on the slightest symptom of commencing trouble.

CASE 1.—J. L. S., age three years, stuck the point of a pair of scissors into the right eye, about a week before I saw him. On examination a large punctured wound was seen in the inner and lower part of the cornea, extending into the ciliary region; a large hernia of iris was entangled in this wound; lens swollen and opaque, and filling the anterior chamber; enucleation advised at once, but was declined. Directions were given to watch for any signs of irritation in the well eye. Ten days after this I was informed that the light was so painful to the eyes that the room was darkened all of the time. Also that the pain in the eyes and head prevented the child from sleeping much in the night. This condition had been present for several days. An examination showed the right eye in the same condition as when first seen, *the left eye much injected.* The right eye was removed at once; solutions of atropine and cocaine were used in the eye, and mercurial ointment rubbed into the temples, but with no benefit; the pain and irritation continued, and although the child was taken out of town, and the optic nerve resected, the sight gradually failed, and ultimately was lost.

CASE 2.—Master B., age nine years, was struck in the left eye, the night before I saw him, by a piece of glass thrown by an older boy. On examination a small punctured wound was seen in the upper and inner border of the cornea, passing into the sclera; a small piece of iris protruded from the wound. The protruding iris was clipped off, a solution of eserine was used in the eye, and strict orders given to watch for any signs of inflammation in both eyes. Four weeks have passed, and no signs of trouble have appeared in either eye.

CASE 3.—W. J., age twenty-two months, fell and stuck a piece of stubble into the left eye, about a week ago. An examination showed a large wound extending transversely across the cornea, all of the corneal tissue opaque, so that no view of the deeper parts could be obtained; T —2; enucleation was proposed but declined. In about ten days the child was again brought to me with unmistakable signs of irritation in the well eye. The injured eye was removed at once, and in a few days all signs of trouble had vanished, and the child could play out-of-doors without the light troubling him.

Case 4.—H. H., age four years, was struck in the right eye with an arrow, about an hour before I saw him. A large lacerated wound below the cornea, about one *cm* in extent and almost wholly in the ciliary region, was found; iris and vitreous were protruding from the wound. The eye was removed on the next day, and the case has shown no signs of trouble since.

SUBJECTIVE LIGHT SENSATIONS FOLLOWING ENUCLEATION OF THE EYEBALL.

By J. WALTER PARK, M.D.,

LATE CLINICAL ASSISTANT ROYAL LONDON OPHTHALMIC HOSPITAL, MOORFIELDS, LONDON, ENGLAND; OPHTHALMIC SURGEON TO THE HARRISBURG HOSPITAL AND CHILDREN'S INDUSTRIAL HOME, HARRISBURG, PA.

THE following very interesting case came to the dispensary department of the Harrisburg Hospital in October, 1890, and was the first patient of the kind I ever had, and in the language of an eminent ophthalmologist, is "almost unheard of":

Miss —— P., aged thirty-three years, by profession a music-teacher; had *ophthalmia neonatorum* four days after she was born, resulting in almost total blindness in both eyes. Was entirely blind in L E, and in R E could only discern the sun, moon, and a few colors, until in 1880, when epileptic convulsions set in, having as many as forty to fifty per week. These finally ceased in 1888 under large and continued doses of potass. bromide.

In April, 1885, panophthalmitis began in R E, for which it was enucleated on May 2, 1885. Three days after enucleation she began to have subjective sensations of light, varying in color and degree of brightness, and which continued up to the time that I last saw her, which was in December, 1890. Her descriptions of these sensations of light were as follows.

It appeared as though there was a lighted candle in the orbit, most of the time of a bright white light; some days it resembled a red sunlight, and other days like twilight. The days resembling twilight she describes as being very pleasant, but as *they* were few in comparison to the others, their continued annoyance was very distressing, and she wished to be in total darkness if treatment would accomplish it.

The white light would occasionally become so bright as to cause intense nervousness. This nervousness would always diminish, and sometimes disappear after she had been lying down several hours and resting.

Occasionally she is in total darkness, but has had but two or three days of total darkness in five years. During the dark days, regardless of her overtaxing her nervous system, there is no increase in the light sensations, but when the light sensations are bright, excessive mental work compels her to quit work and lie down in order to get relief. During these severe attacks she suffers with a dull and heavy sensation through the temporal and occipital regions.

She would invariably obtain relief much quicker by lying on the left side. Going out into the fresh air would also afford her some relief. Cold applications to the orbit would do no good, but cold water forced in jets into the orbit would relieve her for five to ten minutes. She is less annoyed when she is not busily engaged in any work that requires considerable mental effort. Has two or three bright days in succession, followed by one not so bright.

As for permanent relief, all treatment seems of no avail. Large doses of potass. brom. and ergot, continued for some time, give her some relief. Two of my colleagues and myself examined the orbit very carefully, but could find no enlarged or bulbous condition of the orbital end of the optic nerve. Pressure within any part of the orbit had no effect upon the light sensations, nor caused any pain in any manner whatsoever. I will not at present attempt to give any physiological explanation of these phenomena, but will ask the following questions. Would a diseased condition of the orbital end of the optic nerve cause these symptoms, or would a hyperæmic or congested condition of the optic tract or visual centres, produce these phenomena? I will be pleased to hear personally, from any of the profession who have had similar cases.

TREATMENT OF GRANULAR EYELIDS BY CANTHARIDATE OF POTASH.

By J. SANTOS FERNANDEZ, M.D., Havana, Cuba.

I DO not pretend to write extensively upon the application of cantharidate of potash in this most troublesome disease, which has put to hard work the mind of the ophthalmologist of all times. To-day I shall only point out the favorable changes which have been effected in those patients under my care submitted to the above treatment, reserving for a more complete article the question of whether we may accept or reject the results, which as yet can only be considered as reasonable hopes.

As granular eyelids are frequently observed in every ophthalmic dispensary, although not so much in Cuba as in other countries where poverty is more prevailing, every specialist has been able to try for this disease such remedies as would seem to promise real benefit.

Not long ago the use of jequirity was claimed by many as positively successful. This new substance I submitted to a careful test, the results of which I reported in several papers which I read before our Royal Academy of Medicine and Natural Sciences. Although this mode of treatment is undoubtedly beneficial to a certain extent, it is also true that it is not entirely free from danger, as proved in some of my cases. The same is my opinion as to the use of gonorrhœal pus, particularly recommended in Belgium; in this case the *therapeutic disease* is so severe and so important the organ to which it is applied, that I have always proceeded with the utmost care, considering the particular con-

ditions under which our perpetual summer places the patients. I use jequirity sometimes anyhow, for every treatment has its opportunity, and its clinical value is determined by the right selection of the cases.

If the granular eyelids have been energetically treated by medical resources, the surgical methods suggested for them have been still more severe. One of the methods proposed is Galezowski's, which consists in the excision of the *cul-de-sac*, and which has met with strong opposition among his adversaries. This method was submitted by me to a most careful examination, and was the subject of several papers. It has been said that the excision was always followed by serious accidents, such as the exaggerated retraction of the surrounding tissues of the eyelid. My experience has not confirmed this assertion, some of my patients having been under observation fifteen years after the operation.

After this it will be easily considered that I was well prepared to try the cantharidate of potash injections as soon as I learned that it could improve to some extent the condition of such patients as had been subjected to a useless treatment during a long time.

Dr. Oscar Liebreich's communication to the Med. Society of Berlin (session of February 25, 1891) suggested to me the idea of trying this method. Liebreich considers the particular action of the cantharidine as due to the fact, well established by Buchner, that blood serum enjoys bactericidal properties; the cantharidine injections producing an increased flow of serum, especially in those organs where an inflammatory process takes place, it results that the method can be extremely favorable as one of the so-called elective remedies.

One of the patients treated by Dr. Liebreich for a laryngitis tuberculosa was under the care of Dr. Gutmann for a double trachoma since 1887, and had been treated all the time with sulphate of copper. Fourteen days after Liebreich's treatment was pursued, it was observed that the left eye was little irritable, and its conjunctiva smooth, and in the right eye the conjunctiva still slightly thickened and beset with very few granulations, which were removed for

microscopical examination. Dr. Gutmann acknowledges that one single case proves little, but thinks that the prompt healing of the conjunctiva in this case is a fact deserving further studies.

I have tried, by common consent with my friend, Dr. Diago, the cantharidate of potash in five patients, from the 1st to the 20th of April, 1891; at this moment being obliged to leave for Europe, Drs. Madan and Acosta will carry on the observations, in order that I may on my return make an exhaustive report.

CASE 1.—J. A., Chinese (No. 23,021), æt. forty-three; has been sick since September 25, 1887. Actual cautery was applied to left eye on account of the existence of thickset granules; after that he has been treated with sulphate of copper, cadmium, and silver iodide; during this treatment no increase was observed as to the granulations. First injection of 0.05 *mgm*, which dose was increased to 0.1 *mgm*. The eighth day some uneasiness appeared, which prevented him from coming to my office. To-day the conjunctivæ are more pale; no positive improvement can be detected in this case, which will continue under the same treatment.

CASE 2.—A. B., yellow girl (No. 21,971), æt. fifteen. The diagnosis, "granulations and *pannus granulosus*," was established in December, 1889, but regular treatment was not pursued until September 25, 1890; this treatment consisted in frequent cauterizations, which succeeded in removing the acute state of the disease. When the injections were begun, the irritability was not very great. After a treatment of twelve days the conjunctivæ were smoother, but the patient, being exceedingly timid, refused more injections.

CASE 3.—J. R. G. (No. 25,077), æt. thirty-two, was first examined on March 3, 1891. Diagnosis: acute granulations, with suppurative keratitis in both eyes. The injections were first applied in the temples, and later in the arms. But the temples being painful, and the patient afraid, further injections were adjourned.

CASE 4.—M. V. y C., a girl æt. eleven; granulations since July 5, 1888; treated with ordinary remedies. On second day, first injection to right temple; third day, second injection to left

temple, and afterwards in the arms. After ten injections, less injection of the conjunctivæ was noticed, and better appearance. I cannot as yet, nevertheless, affirm any marked change. Treatment will be carried on.

CASE 5.—M. C. (No. 4,847). This patient was treated long ago for an opacity of both corneas. Has suffered many acute attacks. The injections have been applied every other day; the condition of the conjunctiva has greatly improved, it being less injected and smoother. The patient himself has noticed the advantages of the method, and is perfectly disposed to continue.

Although I have observed more cases than Dr. Gutmann, I cannot as yet assert anything positive; I publish these few cases because they prove that if this method of treatment is not really beneficial it is at least harmless.

It was certainly a mere coincidence that called Dr. Gutmann's attention to this treatment, but after all, I think its use in granular eyelids is supported by good reason because of the analogy between granulations and tubercle, the tubercle consisting chiefly in cells which contain the specific bacillus; these cells later undergo fatty degeneration. The lymphoid cells of the granulations disappear, leaving behind them connective tissue, which is also apt to degenerate.

Fatty degeneration of the granulations has been observed, although very seldom. The tubercle when degenerated may act as a foreign body with infectious properties, and hence give rise to suppuration and ulcers; the granulations disappear like the cutaneous gummas, and often leave behind them a scar without previous suppuration.

HAVANA, April 24, 1891.

REPORT OF TWO HUNDRED CATARACT EXTRACTIONS.

By Dr. ROSA KERSCHBAUMER, of Salzburg.

Translated by Dr. Casey A. Wood, of Chicago.

THIS report includes two hundred cases operated upon between May, 1881, and January, 1883, and is a continuation of two previous hospital reports covering the time between 1878 and 1880 inclusive.

The total number of operations performed since the publication of the above mentioned communications to the end of 1888 exceeds five hundred. Of the remaining three hundred, as well as of others undertaken since, I shall publish a further report.

I.—METHOD OF OPERATION.

All the extractions were performed by the modified Graefe method, including a conjunctival flap and a small iridectomy. Great importance was attached to the careful and proper reposition of the edges of the cut iris. Except when the capsule was thickened it was opened by the cystotome; in the former case the capsule forceps were used. The lens was then delivered by the pressure of a Daviel's spoon on the cornea, cortical remains being removed by massage with the lower lid.

Asepsis was sought to be established both during and after the operation.

The instruments were first disinfected in alcohol and then in a solution of carbolic acid. For the past four years we have been in the habit of placing them, just before using, in boiling water.

In earlier years the dressing was carbolized cotton-wool. Since then we have used absorbent (Bruns) cotton, which has been soaked in a solution (1:5000) of sublimate. This solution is also employed for cleansing the hands, the conjunctival sac, and the parts about the eye.

II.—ACCIDENTS ATTENDING THE OPERATION.

A.—ESCAPE OF VITREOUS.

This happened thirteen times; eight times with uncomplicated and five times with complicated cataract. In no instance did loss of the eye occur. The following is a brief account of each case.

a.—Simple Senile Cataract.

J. E., æt. seventy-eight. Had senile marasmus. Cataract (R.) mature. Excision of iris followed by considerable loss of vitreous in consequence of patient's "screwing up" his eye. Chronic cyclitis. At his own request patient was discharged with cyclitis and V of $\frac{6}{60}$. Five months later returned with occluded pupil. After iridectomy sight could be improved from $\frac{1}{60}$ to $\frac{6}{24}$. Vitreous opacities.

R. L., sixty years old, during removal of lens (R. for mature cataract) forcibly contracted orbicularis. Normal recovery. V $\frac{6}{12}$.

J. V., sixty-nine years. Senile marasmus. R. mature cataract. During iridectomy on L. (hypermature cataract) nucleus receded and hyaloid presented in the wound. There was a moderate escape of vitreous, the lens being extracted by the aid of Weber's scoop. Good recovery. V $\frac{6}{60}$; later $\frac{6}{24}$. Cloudy vitreous.

W. G., æt. sixty-four. Hypermature cataract. Nucleus sank after excision of iris. Lens removed in its capsule. Loss of vitreous. Normal recovery. V $\frac{6}{18}$; subsequently $\frac{6}{12}$.

L. J., æt. sixty-three. L. mature cataract. Patient pressed out quite a quantity of vitreous. Could not remove cortical substance. All went well until eighth day, after which slight cyclitis. V $\frac{6}{60}$. Secondary cataract.

K. H., æt. seventy-four. L. hypermature cataract. During removal of cortical remains a moderate amount of fluid vitreous escaped. Thickened capsule remained. Recovery normal. V $\frac{6}{36}$. Vitreous opacities.

W. J., æt. sixty-three. Morgagnian cataract R. Semifluid vitreous escaped after corneal incision. Extraction by means of Weber's scoop. Fluid cortex. Cataract spherical. Good recovery. V $\frac{6}{9}$.

S. G., æt. sixty-two. R. hypermature cataract. A small amount of fluid vitreous lost during removal of cortical remains. Recovery normal. V $\frac{6}{9}$; later $\frac{6}{6}$.

b.—Complicated Senile Cataract.

Th. H., æt. sixty-nine. L. hypermature cataract. Obliged to enlarge primary incision. Nucleus extracted with difficulty. Escape of vitreous. Slight cyclitis during recovery. Hazy vitreous; choroiditis. V $\frac{6}{36}$.

B. Th., æt. fifty-eight. Hypermature cataract. Iridodonesis. After completing incision vitreous presented. Lens with capsule delivered by means of the scoop. Moderate loss of vitreous. Normal recovery. V $\frac{6}{36}$. Vitreous opacities.

W. A., æt. sixty-four. Adherent cataract L. During removal (July 7, '82) a large amount of vitreous was lost. Normal recovery. V $\frac{6}{36}$. Vitreous opacities.

M. M., æt. sixty-seven. Complicated hypermature cataract L. During removal of cortical remains a bead of vitreous escaped. Recovery normal. V $\frac{6}{12}$.

F. C., æt. thirty-seven. Mature cataract. Excessive myopia; choroiditis, and vitreous opacities. Patient, otherwise healthy, says she has had weak and short sight since early childhood. Extraction Jan. 10, '82. Corneal incision followed by escape of fluid vitreous. Cataract and entire capsule delivered with scoop. Good recovery. V $\frac{6}{24}$.

S. E., æt. fifty. R. traumatic cataract. Iridodonesis. After incision vitreous. Cataract in capsule extracted by means of Graefe scoop. Considerable loss of vitreous. V $\frac{6}{36}$. Vitreous opacities.

B.—EXCESSIVE HEMORRHAGES.

These occur (1) from the conjunctiva, (2) after iridodialysis, and (3) spontaneously. The last is the result of senile changes only.

In every one of this series of cases in which the accident occurred the blood was absorbed without producing inflammatory symptoms and without noticeable effect upon either the convalescence or the visual acuity.

III.—AFTER-TREATMENT.

In cataract extraction the after-treatment plays an important part, not only as regards the medical attendance and the nursing, but the condition of the patient must also receive consideration. The greatest care should be observed in applying and renewing the antiseptic dressing. At first we used dry carbolized cotton-wool and flannel bandage, but this was later on discarded for sublimated absorbent cotton with which all patients are now dressed during the first week. In addition to this there is placed at the inner canthus between the puncta lacrymalia a small sublimate tampon, sprinkled with iodoform. By this means all secretions from the canaliculi are carried off through the interpalpebral aperture, or are, at least, disinfected. I have found this little plug to possess another advantage: it drains off the tears which would otherwise collect in the conjunctival sac and annoy the patient.

Following the example of my teacher, Prof. Arlt, I allow those patients in whom the operation was without accident to sit up in an arm-chair forty-eight hours after extraction. I find that, as a rule, they are quieter under this treatment and sleep more soundly at night.

IV.—ACCIDENTS OF CONVALESCENCE.

a.—Primary Suppuration.

I can recall but one example of primary purulent infection of the wound among all the cases included in this report.

R. M., æt. seventy-one. L. hypermature cataract. R. phthisis bulbi. Patient is a sad example of our mountain cretinism. She had, two years before, been operated upon elsewhere for cataract in right eye. After an entirely satisfactory extraction (Aug. 18, '82) patient repeatedly tore off the bandage. Wound became infected in twenty-four hours, then purulent iridocyclitis, and finally panophthalmitis.

b.—Cyclitis.

This occurred in twelve cases. In seven there was incarceration of the iris, in three the cataract was complicated, and in two the patient was marasmic.

St. M., æt. seventy-four. Cyclitis. When discharged V $\frac{6}{36}$; in about two months $\frac{3}{60}$; cyclitis at an end; dense secondary cataract.

E. J., æt. fifty-five. Cyclitis on tenth day. Vitreous opacities. When discharged V $\frac{6}{60}$, which improved spontaneously until in six months it was $\frac{6}{30}$.

H. U., æt. sixty-five. Discharged in good condition on tenth day. V $\frac{6}{36}$, with secondary cataract. Used his eyes too soon and imprudently, and in consequence the eye operated upon became painful, red, and tender. After eight weeks he returned to me suffering from severe iridocyclitis and occluded pupil. Contrary to my advice, he would not remain in the hospital but left for home. Two years afterwards I learned that he had died *blind in both eyes.*

E. A., æt. sixty-eight. Nearly mature cataract extracted April 21, '82. Cyclitis. V $\frac{6}{24}$.

S. A., æt. seventy-five. Small wound; large nucleus; delivery difficult. Iris incarcerated at both angles; occlusion of pupil. V$\frac{1}{\infty}$.

B. J., æt. sixty-two. Incipient cataract R. Reopening of wound on second day. Incarceration of iris in external angle. Cyclitis. V $\frac{6}{60}$.

T. T., æt. sixty-three. R. extraction. Iris in outer angle. Eighth day after operation severe cyclitis. On the twenty-sixth day V $\frac{1}{60}$. A year later I saw him again in consultation, and found an occluded pupil in the right eye and evidences of a recent *sympathetic* affection of the left. Doubtful light perception in both eyes.

S. E., æt. seventy-seven. Marked collapse of cornea, with cyclitis and keratitis striata. V $\frac{6}{18}$.

c.—Incarceration of Iris.

This resulted in thirteen cases; six of these recovered perfectly, but the remaining seven had cyclitis, as described above.

As a rule, incarceration occurs when in consequence of an inaccurate iridectomy or imperfect reposition of "tags" of iris, the latter becomes entangled between the lips of the incision. This accident also happens, though less frequently, if the wound should be ruptured; the aqueous escapes and draws with it into the wound not only cortical remains but

the sides of the coloboma—however perfect the position of the latter may have been.

d.—Keratitis Striata.

This was present in 6–8 % of the operations, and almost invariably in patients suffering from senile marasmus. With one exception—complicated by cyclitis, the result of an imprisoned iris—the cases were unimportant.

e.—Rupture of the Corneal Wound.

There were five of these cases; two had in consequence corneal astigmatism, while the other three ran a normal course.

In my opinion this accident is not a serious one so far as the safety of the eye is concerned, unless infection of the wound sets in, or incarceration of the iris occurs, or unless it is the result of considerable violence. In the last instance we may have loss of vitreous, extensive intraocular hemorrhage, or even retinal detachment. On the other hand, the visual acuteness is very likely to suffer, especially when the injury happens several days after the extraction. The wound then heals, enclosing adventitious material between its surfaces, and corneal astigmatism is produced.

V.—ACUTENESS OF VISION.

After ordinary cataract operations three causes especially affect the visual acuity.

1. Secondary cataract.

2. Astigmatism of the cornea. We do not conceal the fact that this defect is the result of an inaccurate corneal incision in at least one half the cases.

3. Senile changes in the choroid.

VI.—SECONDARY OPERATIONS.

These are called for in (1) secondary cataract and (2) occluded pupil.

In the first instance I usually perform discision with a Graefe knife; occasionally, however, I use the discision needle. A narrow Graefe knife is passed into the anterior chamber through the lower segment of the cornea (about

2 *mm* from the limbus) until its point reaches the upper limit of the coloboma, and the cataract is divided down to the pupillary border. By this means, especially in recent cataracts, a wide opening is made in the membrane.

This procedure is productive of better visual results, and causes less bruising than discision with the needle. When several months or a year have elapsed since the extraction, it is always more difficult to make a gap in the secondary membrane on account of its increased density. For this reason I employ in such cases a simple needle or have recourse to the double-needle operation.

In my opinion discision can, in normal cases, be advantageously done as soon as three weeks after the extraction.

In explanation of the relatively small number of discisions for secondary cataract—fifteen out of forty-four cases—I would point out that most of the patients belong to the peasant class, who, as a rule, are satisfied with a small amount of sight, and hence do not take advantage of a secondary operation.

In one case only was an operation performed for the relief of occluded pupil—the first patient mentioned under heading II. A. An iridectomy with the Graefe knife was followed by excellent results.

Original vision.	Number of cases.	Improved to.						Total number improved.	Ultimate vision.		
		6/6	6/9	6/12	6/18	6/24	6/36		Good.	Indifferent.	Lost.
6/60	1								1		
6/36	7	1						1	7		
6/24	27	2	3					5	27		
6/18	61	1	8	6				15	61		
6/12	41		1	3	3			7	41		
6/9	35		1	2	5	2		10	35		
6/6	20				4	3	2	9	9	11	
3/60	1									1	
2/60	1				1			1	1		
1/∞	4										4
O	1										1
Not tested.	1										
	200							48	182	12	5
									199		

ANOMALIES OF THE OCULAR MUSCLES.

[FOURTH PAPER.]

By Dr. GEORGE T. STEVENS, New York.

VII.

AN EXAMINATION OF VON GRAEFE'S DOCTRINE OF "ANTIPATHY TO SINGLE VISION."[1]

IN Von Graefe's classical description of the condition to which he applies the term, "Antipathy to Single Vision," he says: "It has sometimes happened to me that after squint operations with apparently correctly adjusted visual axes there have resulted double images only slightly removed from each other. The visual power of each eye has been quite good, alternating strabismus having previously existed, and the accommodative power has been similar in the two eyes. Nevertheless it has been in no way possible to bring about single vision."[2]

He states that this condition of double seeing persists notwithstanding the interposition of prisms in various positions, and that every effort of the patient to unite the images results only in removing them to still greater distances.

He adds: "The tendency appears to be a direct physiological contradiction; for while in sound eyes some approach, especially in case of large retinal pictures, is sufficient to induce arbitrary muscular contraction in the interest of single vision, in these cases, on the other hand, it is found that

[1] Read at the meeting of the American Medical Association, May, 1891.
[2] *Arch. für Ophthalmologie*, i., 1, 117.

exactly the opposite condition prevails, there being an absolute incompatibility to single vision."[1]

In a still later article[2] he describes the condition more at length, pointing out the fact that the double images, although not far removed, pass from one side to the other, above and below, or one behind the other, always on the point of uniting, but never united. Von Graefe explains the anomaly on the theory, first, of injury to the nervous centres or faulty projection from the retinæ, and, second, of the supposed difficulty of obtaining regular associated action between muscles which have long been unaccustomed to association.

A careful examination of many of these cases of "antipathy to single vision" leads me to conclusions different from those arrived at by von Graefe, and the practical application of these conclusions has shown that they are, at least in a great measure, correct. That, in a proportion of these cases, the technical details of disturbing elements may elude our search is undoubtedly true, but that the principles which I shall present will apply very generally I am fully convinced.

In a paper read before the American Medical Association, June, 1889,[3] I have already expressed my disbelief in the generally accepted view of the existence of a physiological antipathy to single vision, and my conviction that, by properly selected and properly executed proceedings, this unpleasant condition may usually be eliminated.

The view of the causation of this anomaly, as set forth in that paper, may be briefly condensed into a single sentence.

The condition of antipathy to single vision as described by Graefe and by subsequent authors depends not upon lesion of the brain or faulty projection of the images from the retinæ, but upon unequal tension of corresponding ocular muscles under the influence of corresponding nerve impulses directed to them.

I do not assert that no irregularity in projection from the retinæ can occur, nor that cerebral lesions may not induce

[1] *Arch. für Ophthalmologie*, i., 1, 118.
[2] *Arch. für Ophthalmologie*, iii., 1, 119.
[3] Published in ARCHIVES OF OPHTHALMOLOGY, vol. xviii., p. 371.

incorrigible diplopia. Such cases, if found, will present other and more definite phenomena of the existing ocular or central nervous disease than simply the presence of diplopia. The proposition refers to the cases which come fairly within the class so clearly described and so sharply defined by Graefe.

Excluding then, cases of paresis, and confining ourselves to the class of cases thus defined, we shall find the causation of this supposed antipathy mainly in two conditions. The first of these is acquired as the result of the squint operation or operations. It consists in the fact that by unequal settings back of the insertion of the corresponding tendons, there are induced irregular responses to the impulses directed to these corresponding muscles. In the examination of a very large number of cases, I have found this condition, but generally modified by a second to be mentioned presently, by far the most prevalent. There will be found in such cases either an excessive rotating power, or a power of rotation only moderately restricted, of the muscle of one eye, internal or external rectus, while the rotating power of its direct associate of the other eye is materially restricted. As a consequence of this irregular and unequally balanced condition of opposing muscles no harmonious adjustments can be made, and the more earnestly the patient strives to bring about associated action, the more signally he fails.

That "settings back" of the ocular muscles to an unequal extent may be made with propriety and with success, was taught by the great master, von Graefe, himself, and the practice has been very generally continued to the present time.

It is true that von Graefe advised in extreme cases a division of the operation between the two eyes, but in fact, this was a concession only to most obvious disabilities involved in the failure of the most conspicuously associated movements toward the side opposite the eye operated on, if in a case of converging strabismus, and an impediment to even approximate convergence at near points. Within the limits of extreme results a full correction of the appearance of squint was, according to his teaching, not only permissible

but desirable. This proceeding of making a correction of squint by a single operation has been supposed to be sustained by the theory that the muscle of the squinting eye is pathologically shortened to a considerably greater extent than its antagonist.

It may be conceded that there is, within certain limits of unequal tensions of accordant muscles, a possibility of union of images; otherwise binocular vision would in no case be established except when exact balancing of the tension is secured. That easy and permanent associated action is compatible with any considerable degree of diversity of tension, I do not believe.

It may be objected that if this proposition is correct the proportion of perfect corrections for squint by the prevailing methods of operating must be less than is ordinarily supposed. It is probable that examinations made by methods more exact than those which have been ordinarily employed would show that a very large proportion of cases in which binocular vision has been presumed to have been established by the ordinary squint operation is much smaller than is commonly supposed. However this may be, whether the results of the standard squint operation is often successful or not, it is certain that such unequal tensions are in many instances incompatible with a blending of the images.

A second causative influence, and one which acts as an element in nearly all of these cases, is the difference in relative tension of muscles which act in the vertical direction.

The instinct of bringing images to the same horizontal plane appears to be very great and only second, if indeed it is second, to that of union of images. In case of double images, whatever the difficulty of blending may be, the patient instinctively exerts his best endeavors to place the images in the same horizontal plane. It thus happens, that in certain cases in which, either with or without slight lateral inequality of tension, the effort to bring images to the same plane induces a lateral squint,—a squint which may be variable; that is, such a squint may at one period of life be converging, and at another diverging. Thus, in a case now under my observation, the patient was, during her child-

hood, subject to a very pronounced converging squint. During the past twenty years she has had conspicuous diverging squint, although no operation has been made. Such a condition may properly be called *variable strabismus*, its character of divergence or convergence changing from time to time, remaining possibly in one direction during several years, then changing to the opposite direction.

If in such a case one or both interni or externi are cut, double vision of an intractable form is likely to result. In such cases we must make diligent search for the vertical deviation, a condition often obscure or not at all manifest, before we can succeed in establishing binocular vision.

FIG. 1.

I have had the good fortune to obtain a daguerreotype portrait of the lady whose case has just been mentioned, taken during her childhood, and from which I have made an enlarged photograph which I have the pleasure of showing (Fig. 1). The photograph shows converging squint, so pronounced that few ophthalmic surgeons even at the present day would hesitate in regarding it as a proper case for a free division of the internus of one, if not of both eyes. Had

such an operation been performed upon this patient in early life, intractable diplopia would doubtless have resulted, and eventually extreme diverging strabismus. In another photographic portrait of this lady, made by myself a year ago (Fig. 2), a moderate appearance of diverging strabismus is seen.

FIG. 2.

In fact a divergence of more than 12° with corresponding crossed diplopia existed. But the most striking feature suggested by this photograph is the left hypertropia, well defined in the position of the eyes and of the brows. The question at once arises whether the change from converging to diverging strabismus is not the result of some radical change in the static condition of the eye-muscles. That this is not the case will be seen by the most cursory glance at the third portrait (Fig. 3), in which the old converging squint has returned. This condition of convergence can be

FIG. 3.

induced at any time by the application of a solution of atropine to the eyes. At the time of taking this third portrait, atropine had been applied twice a day for three successive days, and its effects were complete. A week after

that time the diverging squint had returned and has continued during the year. The transformation from divergence to convergence occurs within an hour after the first application of the atropine, and the present habitual condition of divergence returns as soon as the effect of the drug passes off. This variableness is, without doubt, due to the action of the muscles in the effort to overcome the unequal height of the images, and until the condition of the hypertropia is eliminated such changes of the lateral relations are liable to occur. In passing, a single thought may be given to the adverse testimony of such cases to the well known doctrine of the relations between the excessive efforts at accommodation and converging strabismus; for here the converging strabismus occurs only when accommodation is neutralized. The present interest in the case centres in the fact that had a free tenotomy of an internus been practised during childhood, the almost certain result would have been an "antipathy to single vision." Even at the present time, when the conditions of hyperphoria and hypertropia are carefully sought for, this patient is able, under many circumstances, to conceal completely the evidence of hyperphoria as shown by the phorometer.

A curious fact in connection with the inequality of tension of the lateral muscles associated with hyperphoria is that a condition which in a passive state of the muscles of either eye or of both eyes is a marked divergence, becomes, as soon as all the muscles are engaged in the act of adjustment, pronounced convergence attended by homonymous diplopia. Conversely, a like change may occur when the tendency is, in the passive state, to converge.

A very practical illustration of what has been stated may be found in an actual history which I condense for this purpose. In a child with left hyperphoria (or hypertropia) the left eye drifted outward during the first few years of life. (Such a diverging squint is rarely observed by parents unless it is extreme.) At length, presumably as the result of a change in the methods of making the efforts to adjust for the horizontal plane, the squint became convergent. The appearance of the eyes of this patient in early childhood is

represented in Fig. 4, which is copied and enlarged from a daguerreotype picture of him taken at the age of about three years.

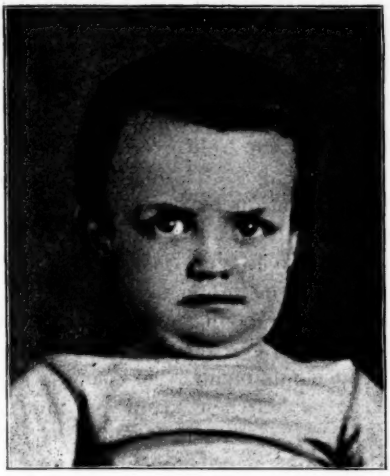

FIG. 4.

It is to be remembered that in the daguerreotype portrait the features are reversed.

About three or four years later, and after the divergence had given place to convergence, a surgeon performed tenotomies of the two recti interni, presumably severing both tendons completely. The result proving an over-correction, the effect of the operation on one eye was modified by the insertion of a (conjunctival?) suture. The result, in view of what has been stated above, was such as we might anticipate. Double vision of the most annoying character was always present. The efforts of many distinguished surgeons to induce these twin images to unite by means of prisms, even for an instant, were fruitless after trials repeated during many years. The case found a prominent place in ophthalmological literature, endorsed by several distinguished surgeons, as one of the class now under discussion. No case could therefore afford us a better model for our study.

It proved easier for this patient to fix objects with the left eye. That being the case, we may suppose that he would make a certain effort of adjustment with the weakened internus of that eye, which would be associated with a corresponding excessive effort of the opposite internus. But these unequal efforts would also be combined with the effort to adjust for the difference in the positions of the images with reference to the horizontal plane. The result would be an excessive rotation of the right eye to the nasal side with homonymous double images. If, on the other hand, a patient with this combination of defects should look at an object which is isolated from other objects which may serve to aid the disabled eye in active adjustment, as, for instance, at a church spire or at the moon or a bright star, in which cases only the clear sky is in immediate relation to the object, the most disabled eye would at once drift outward, and crossed diplopia would result. So also, if a small screen were to be interposed between either eye and the object looked at, thus shutting it out from active participation in the effort of adjustment, the covered eye would diverge in a marked manner and would move inward, perhaps to the extent of one third the diameter of the cornea, as soon as the screen should be removed, and then homonymous diplopia would be observed. Or again, if the subject of such a defect were to look through a grating, as, for instance, through the palings of a picket fence, an object seen beyond the fence would be seen doubled, and the diplopia would be crossed; while an object seen between the person and the fence would be double also, but the double images would be homonymous. In the first instance, looking beyond the fence, the adjusting energy of one eye becomes passive, as in the case of looking at the object against the clear sky, with resulting crossed diplopia. In the other instance, looking at the object nearer than the fence, active adjustment of both eyes occurs with excessive convergence and homonymous double images. All these suppositions and conclusions have been fully justified in the actual treatment of these cases.

In certain cases in which this intractable diplopia exists, the patient has the extraordinary faculty of selecting at will

which eye shall fix the object, and the diplopia becomes homonymous or crossed, according as the one or the other eye is engaged in direct fixation. Thus, in the case of a lady patient, if I direct her to look with the right eye, I can see that the eyes are strongly converged, and she reports the presence of homonymous double images. If I then direct her to look with the left eye, the change may require a few seconds or it may take place very quickly. Then the eyes are plainly seen to diverge, and the diplopia is crossed. In such a case, the nervous impulse directed to the right internus is greater than the normal during fixation with that eye, and when a corresponding impulse is sent to the left internus, the eye is caused to swing in excessively and too great convergence results. On the contrary, when the left eye is fixed, there is no such excess of nervous impulse sent to the left internus, and as no excessive impulse is therefore sent to the right internus, that eye swings outward passively, and crossing of images results. But in this explanation we must not lose sight of the important, probably the most important, element in the causation of the inward swing in many if not in the majority of cases. This is the influence of the difference of tension of the muscles which move the eyes in the vertical direction. This influence is often sufficient, even though the moving power of the corresponding lateral muscles should be equal, to cause a swing beyond that which would result from a given impulse to a lateral muscle. I have rarely met with a case of the so-called "antipathy to single vision" in which this element did not play an important rôle.

It needs no argument to show that the defect which causes the patient to have homonymous diplopia when looking at an object, say at twenty feet distance, and heteronymous diplopia when looking at the same object, if a grating, like the fence of which we have spoken, is interposed between the eyes and the object, or which causes the same patient to have homonymous images when looking at an object surrounded by other objects, and crossed images when looking at an object isolated from visible surroundings, lies neither in the brain nor in faulty projection from

the retinæ, but in peculiar, although perhaps obscure, defects in the adjusting apparatus.

Homonymous diplopia caused by a brain defect or a retinal defect would remain homonymous under all the circumstances which have just been mentioned. Activity or passivity of certain efforts of adjustment could and would be modified by the circumstances mentioned, and the phenomena resulting, which at first appear confused and irregular, are in reality uniform and in accordance with fixed laws.

It is not to be denied that the investigation of an individual case is often surrounded by immense difficulties, or that each new case may present new and perhaps at first incomprehensible phenomena. It is none the less true that all these cases will be found to be governed by known laws. If the difficulties of interpretation of the phenomena in individual cases are great, it demands the greater skill and patience on the part of the investigator in searching out all the various influences which combine to make the defect.

It would probably be impossible, even if all the facts were in our possession, to lay down distinct rules for the discovery of the exact nature of the faulty relations of muscular tension in each case of this class. To attempt it even to the extent to which the principle has been studied, would be to record separately the experience in each individual case. Enough has been said, however, to indicate the lines on which the investigation is to be made.

In the correction of the defect,—this incompatibility to single seeing,—we must logically seek to re-establish a degree of equilibrium between the mobilizing functions of the opposing muscles. To this end, after first correcting the unequal tendency in the vertical direction, it will, in most instances, be necessary to bring the insertion of the disabled muscle forward, and to reduce the tension of the corresponding one of the other eye. This procedure is by no means as easy as might appear. To readjust the tendon after such a setting back as occurs in the standard squint operation, requires in many instances the most persistent and skilful treatment.

Very little can be accomplished by a gross advancement in which the already disabled muscle is made even less flexible than before. The object is secured by progressive steps, one slight advancement preparing the way for another, until the proper degree of rotation with as great flexibility of the muscle as possible is secured. Then the corresponding muscle of the other eye, if it has not been already relaxed, must be made to assume, as nearly as is required, a corresponding adjustment by a careful relaxation.

Such a procedure has, in my hands, succeeded in establishing binocular vision in many inveterate cases of the so-called "antipathy to single vision." The process is often long and difficult, making the greatest possible demands upon the skill, courage, and patience of the surgeon and of the persistent and intelligent co-operation of the patient.

It has been my purpose to do no more than to indicate in a very general way the principle which I would advance, namely, that incompatibility to single seeing usually denotes incorrect methods of operating, and that there can be no effectual correction of strabismus which leaves the tension of the corresponding muscles of the two eyes unequal. The supposed success of many cases in which such inequality is caused by operation, doubtless results from the fact that in the remaining diplopia the images are so widely separated that the patient does not become aware of its existence.

In order to avoid the evil results of diplopia and to secure not only possible but easy binocular vision, then, we must be guided, first, by the actual rotations of the eyes, and by the actual relation of the visual lines not only in the lateral but in the vertical direction. This can be accomplished only when the patient recognizes the position of double pictures, and this according to the theory of identity. There should be no final operation for the adjustment of squinting eyes, until both patient and surgeon are sure of the relative position of the double images.

A precept which I have elsewhere brought forward is in this connection also of essential importance, viz.:

"*Every modification of the length of a lateral muscle, by relaxation or by shortening, which can in any degree effect the rotation of one eye, should in every instance be accompanied by an exactly equivalent modification of the corresponding muscle of the other eye.*" [1]

If this precept is correct, the practice of relaxing or setting back of an internus, accompanied by an advancement or shortening of the externus of the same eye while the muscles of the other eye undergo no modification, cannot afford the best results.

The subject of the determination of the relative tensions of the various eye-muscles I have already discussed at some length in a series of articles published in the ARCHIVES OF OPHTHALMOLOGY during the years 1887, 1888, and 1889. It is unnecessary to repeat what has there been said, but there is also much more which might be said in connection with the examination of the relative tensions in these peculiar and most difficult cases, which must be reserved for another occasion.

One point, however, is so important in its relation to the subject under consideration that it should not be separated from it. This is the examination of the comparative rotation of the two eyes in the temporal and in the nasal direction. Something can be learned from an inspection of the movements of the eyes as the surgeon causes the patient to follow with the eyes a pencil or other object as it is carried from side to side, the patient making his best efforts to see it as far toward the extreme outer field of vision at each side as possible. It will in most of the cases, in which the original operation has been performed for converging strabismus, be seen that as the eye on which the operation, or the most extensive operation, has been performed moves toward the nasal side its progress is arrested before the border of the cornea reaches the inner canthus.

The nasal rotation of the other eye will often be found to be free or even excessive. But even the nasal rotation of

[1] Anomalies of the Ocular Muscles, ARCH. OF OPHTHALMOLOGY, 1889, p. 407.

this other eye may be restricted, only in less degree than the first. Similarly we may observe a difference in the temporal rotation. This method of inspection, while it is important and in some measure satisfactory, furnishes less exact information than is required in most cases.

In the measurement of the temporal rotation we have in the perimeter an instrument of sufficient precision. It is my custom to place in the carrier of the perimeter a few capital letters in clear type, of about the size, 2 = D, of the Snellen scale, and require the patient to see the letters with sufficient clearness to read them. A glass to meet the requirements of the patient's vision is held in such a way before the eye that it is at a right angle to the line between the eye and the test object. Ordinarily a pair of eyes in which no considerable degree of heterophoria exists will make the temporal rotation about 40° each, and no considerable difference in this rotation should exist. In many of the cases under discussion the temporal rotation will be found to differ for the two eyes to the extent of from 10 to 20°. With the new model of the registering perimeter this element can be quickly and accurately determined.

Unfortunately we have no method so accurate for the nasal rotation. The full rotation of the eyes in this direction in the normal condition cannot usually be determined by the perimeter, except by the supplementary use of a strong prism. Even with this supplement, the extreme rotation inward of cases of slight converging squint cannot be registered by the instrument. In cases in which the rotation does not much exceed the line of vision across the bridge of the nose, we may place a rounded prism with its apex in the canthus. Two degrees of prism equals one degree of the perimeter. Hence a prism of 10°, apex in the canthus, may cause the eye to turn inward 5° more than it would if looking directly at the object. The expedient of placing a scale of degrees on the lower lid and reading from it the nasal rotation, while inaccurate, is sometimes the only recourse, and the best use of an unsatisfactory method must be made.

THE METASTATIC TUMORS OF THE EYE.

By Dr. A. ELSCHNIG,

ASSISTANT IN PROFESSOR SCHNABEL'S EYE CLINIC, GRAZ.

Translated by Dr. Ward A. Holden, New York.

(With six figures on Plate III. of vol. xxii. of German Edition.)

THE primary tumors of the eye, because of their relative frequency, have been carefully described both clinically and anatomically, and are extensively treated of in the literature. The case is otherwise however with secondary tumors. The older ophthalmologists and many of the recent text-books speak only of the direct encroachment of such malignant tumors as have arisen in the vicinity of the eye, and it is only of late that the metastatic tumors of the eye have been noticed. Since these tumors are of interest not only from a pathological standpoint, but also from that of the clinician and general practitioner, I shall mention the cases of metastatic tumors of the eye which have been previously observed, and add an account of two cases which I have myself examined anatomically.

I.—METASTATIC TUMORS OF THE OPTIC NERVE.

I find very brief notices of these cases in the literature. Dittrich [1] described a case of multiple cancerous neoplasms, in which besides numerous tumors in the brain and various cerebral nerves, the optic nerves were found to be swollen just before their passage through the foramen, and the

[1] *Prager Vierteljahrschr.*, vol. xii.

nerve-bundles were infiltrated with cancerous masses. The case of Jacobson [1] possibly belongs here, since there was a tumor of the intraocular end of the optic nerve consecutive to a tumor in the orbital tissue and corresponding to it in structure, being a myxosarcoma with sclerosis, ossification and hyaline degeneration (probably cylindroma [2]). Whether this tumor were in reality secondary, cannot be said with certainty.

Krahn [3] reported a case where there was metastatic cancerous formation in both optic nerves just behind the lamina cribrosa, with carcinoma of the ovaries. The neoplasms lay between the nerve sheaths, sending the cellular masses of which they consisted between the nerve-bundles, and compressing the central vessels. The patient became almost entirely blind about eight months before his death, and three weeks before he died, the usual picture of choked disc and neuritis with hemorrhages in the discolored tissue was observed.

Schiess-Gemuseus and M.-Roth described a metastatic sarcoma of the papilla and the neighboring retina.[4] Microscopic examination showed a spindle-celled sarcoma springing from the papilla and encroaching upon the retina, similar in structure to other metastases and to the primary growth—a nævus of the sternum which had undergone sarcomatous degeneration.

(A case of metastatic carcinoma of the papilla, though not a pure one, will be reported among the cases of metastatic carcinoma of the choroid, right eye. Case 3.)

The rarity of these observations makes the following case one of interest, although the clinical course of the disease was not followed with the care which might be wished.

Karl K., æt. forty-three, was received into the general hospital September 19, 1888, where the diagnosis "tumor renis dextri" was made, and where he was treated until his death. A few days after his admission he suddenly became blind in the left eye.

[1] *Graefe's Archiv.*, vol. x., 2.

[2] *Cf.* Leber, in "Graefe and Saemisch," vol. v., p. 911.

[3] Reference in *Zehender's Klin. Monatsbl.*, vol. x., p. 103.

[4] *Graefe's Archiv.*, vol. xxv., 2, p. 177.

The ophthalmoscope showed a pale disc, and distended and tortuous retinal veins.

The patient died October 20, 1888, no change having occurred in the vision of the eye that had become blind. Autopsy: Inner meninges somewhat thickened, the left optic nerve showing an ampulla-form swelling at its entrance into the foramen, and being replaced by a gray vascular substance, sharply limited at the end toward the chiasm; carcinoma renis dextri primar., cum metast. pulm., pleur., gland. retroperiton. et renis sinistri (carcinoma metast. nervi optici sinistri ?)

The optic nerves were removed together with the eyes. On the intracranial segment of the left optic nerve just within the optic foramen there was a gray translucent club-shaped swelling, limited by a constriction toward the foramen, while toward the chiasm there was no such sharp limitation. The length of the tumor was about 10 *mm*, and the diameter of the nerve in the thickest part of the tumor 8 *mm*. In the optic canal the nerve was very thin, but 12 *mm* from the peripheral margin of the tumor it regained its usual thickness, and was here quite normal (Fig. 1).

Eyeball and nerve were hardened in Müller's fluid and alcohol, and embedded in several pieces, then cut transversely and longitudinally.

The sections of the nerve appeared normal macroscopically as far as a point 17 *mm* behind the lamina cribrosa; from this point posteriorly an increasing number of yellow dots were seen in the otherwise normal nerve-bundles. 30 *mm* from the ball, and 3.5 *mm*. behind the thinnest portion of the nerve, the tumor began as a round mass in the medial inferior part of the club-shaped swelling of the nerve, its yellowish-white smooth tissue being sharply defined from the meniscus-shaped nerve which surrounded it.

Microscopic examination.—The tumor consists of a well developed connective-tissue framework with numerous spindle-shaped and oval nuclei, and blood-vessels, and the meshes are filled with closely-crowded but relatively few large epithelial cells, having a finely granular protoplasm and a large nucleus with 1-2 nucleoli (Fig 4).

While the meshes in the centre are narrower and the epithelial nests compressed and irregularly grouped, the arrangements in the peripheral portions, especially outward and upward, is much more regular and the connective-tissue septa run parallel

to the long axis of the nerve, giving the impression that the interfascicular septa have proliferated and tumor-tissue taken the place of nerve-fibres. Besides the epithelial and connective-tissue elements there are two other components of the tumor, one cellular and one amorphous.

Scattered among the connective-tissue bands of the tumor is a granular tissue in which lie irregularly-angular darkly-stained cells which seem to indicate a proliferation of the glia-tissue of the nerve.

In the peripheral portions of the tumor appear clumps of an amorphous substance staining a bright red with eosin, and brownish-black with Weigert's stain, arranged regularly along the coarser connective-tissue septa, compressed between the two heterogeneous tissue-elements of the tumor. The arrangement of these masses and their color-reactions would indicate that they are a corneous derivative of the medullary substance, which is being broken down by the pressure of the neoplasm.

Inferiorly the tumor reaches to the inner sheath of the nerve and on either side between the tumor and the nerve are only atrophic bundles of nerve-fibres which above become nearly normal. Only at the peripheral end can the nerve-bundles be followed a short distance into the tumor. In a similar manner at the central end the neoplastic tissue pushes into the nerve (Fig. 3), while in the entire longitudinal extent the limit between the two tissues is sharply marked. The nerve-bundles are compressed, the fibres irregularly arranged, and corpora amylacea are scattered through that portion of the nerve which is in contact with the tumor.

The optic nerve more centrally is œdematous, increased in diameter, the nerve-bundles loosened and enclosing spaces filled with finely-granular eosinophilous masses, while the peripheral bundles are atrophic. Nearer the ball the nerve shows some small localized atrophic foci but is otherwise normal. There has been no proliferation of the interfascicular tissue, but the pial sheath is vascular and the meshwork of the arachnoid sheath has been transformed into a dense cellular connective-tissue.

All the morbid changes disappear nearer the eyeball and the nerve for a distance of 17 *mm* from the ball is normal, excepting for some slight perineuritic changes.

The central vessels are distended with blood, but the papilla is unchanged.

This was then a case of metastatic carcinoma of the optic nerve developing in the intracranial segment near the optic foramen, destroying the nerve to a slight extent, but for the most part merely compressing it. The inner sheath of the nerve has not been perforated by the growth. The tissues of the nerve are partly atrophic from pressure, and this atrophy has continued downward in the form of irregularly distributed linear degenerations of single portions of the nerve-fibre bundles, while centrally the nerve is œdematous but not atrophic. The pressure of the tumor has caused a chronic inflammation of the internal sheaths of the nerve, which has extended downward to the entrance of the central vessels. It is interesting to see that notwithstanding the complete obliteration of the subvaginal space at the central orifice of the optic foramen, no hydropic changes are found in the nerve and no choked disc has developed.

Clinically only a paleness and discoloration of the disc with dilatation of the larger vessels were noted. As to diagnosis, a metastatic tumor of the nerve (*vid.* case 3, right eye, in following section) like a primary one would cause a disturbance of vision early, and rapid blindness with no ophthamoscopic changes in the beginning, and in case the metastasis were in the orbital portion of the nerve there would be disturbance in the mobility of the eye, and exophthalmus.

Besides the cases mentioned of metastases in the optic nerve trunk and papilla, the only others which have been studied clinically and anatomically are metastatic carcinomata and sarcomata of the choroid, which will be treated of separately.

II.—METASTATIC CARCINOMA OF THE CHOROID.

To the seven[1] cases which have been reported I would add another which was examined both clinically and anatomically.

T. Magdalena, æt. 57, was admitted to the eye clinic December 10, 1887, with a history of failing vision in the left eye for five weeks. February 18, 1887 the left breast was amputated for carcinoma and the enlarged axillary glands removed. Later a small

[1] Abstracts of these cases may be found in the paper by Mitvalsky. These ARCHIVES, vol. xx., No. 2, 1891.

swelling appeared in the wound and the axillary and supraclavicular glands became swollen, and the patient suffered with a severe cough and pain in the back and legs.

The left eye, normal exteriorly, showed a slight undulating detachment of the retina above the disc, of a pale grayish-yellow color. There was no perforation. The macular region was not detached, and the fovea was seen as a dark-red spot. Below the disc the retina was detached but of normal color. Tension normal. V=fingers at seven feet. Field of vision narrowed upward; downward a large paracental scotoma. Right eye normal.

In the course of a few days the detachment of the retina increased until it surrounded the disc, and the vision grew worse while the tension remained the same. January 4th the retina was totally detached. Paralysis of the left recurrent laryngeal nerve developed, there were girdle pains in the region of the third and fourth ribs, increasing dyspnœa with catarrhal symptoms in both lower lobes, and the patient lost strength.

Later there were symptoms of spinal compression. The intraocular tension became increased, there was episcleral congestion, and the anterior chamber became shallow. The glaucomatous condition increased up to the death of the patient, March 28th, from exhaustion. The course of the retinal detachment—beginning in the upper half and extending—the increased tension, and, finally the appearance of glaucomatous symptoms in the anterior segment, caused a probable diagnosis to be made of *detachment of the retina by a carcinomatous metastasis in the choroid.*

The autopsy showed carcinomatous tumors in the brain, lungs, and liver.

The eyeball was hardened in Müller's fluid and alcohol and divided horizontally. The lens and iris were displaced forward, the retina completely detached, leaving a small conical space filled with shrunken vitreous. The entire subretinal space was filled with a homogeneous fibrinous mass. The choroid for 10-13 *mm* about the disc had a thickness twice that of the normal sclera. The thickened portion was of a mottled light-brown color, almost smooth, and sharply defined from the dark atrophic unthickened choroid.

Microscopic Examination.—The thickened portion of the choroid is transformed into a dense fibrous connective-tissue with spindle-formed and pigmented branched cells and a few blood-vessels, enclosing nests, tracts, and tubules of small epithelial cells which

in their arrangement may be divided into two classes. The first are regular groups of cells, tubular in longitudinal section, in transverse section circular, surrounded often with a fibrous sheath, and always separated from the surrounding tissues by a basal membrane. Many of these contain cavities filled with degenerated matter or red blood corpuscles. The arrangement is most regular in the layer corresponding to the chorio-capillaris. In Fig. 6 lumina are seen which on one portion of the wall have a single layer of cells like endothelium, while in other portions there are several layers of cells showing transition forms.

Beside these there are lumina which have a regular laminated lining, and finally solid cell cylinders. Nowhere can a trace of the vessel endothelium be seen between the vessel wall and the lining epithelial cells. Connected more or less directly with these are seen epithelial cells arranged in a second manner—tracts and groups of cells, which, not surrounded by a basal membrane, seem to force their way into the connective-tissue stroma, are always solid, and here and there show signs of retrograde metamorphosis.

A few vessels are found in all layers of the tumor, but more numerously in the inner, part of them narrow with thick walls and part wide with thin walls like the normal capillaries of the inner choroidal layer. Many of these vessels are partially occluded by hyaline deposits on the lining endothelium.

The lamina vitrea has been destroyed in many places, and the pigment epithelium is irregular and partly wanting.

The two superior venæ vorticosæ, which were examined in transverse sections, were occluded partly by proliferated endothelium, partly by epithelial groups lying in masses of coagulated blood, portions of which had undergone calcareous degeneration.

All portions of the tumor, but chiefly those which are apparently the oldest, near the papilla, show evidences of retrograde metamorphosis, and these portions do not take the stain. Some parts also have undergone calcareous degeneration. The tumor is sharply limited equatorially from the uninvolved portion of the choroid, which is markedly atrophic, and contains a few vessels with sclerosed walls. The iris, which is pressed against the cornea in most of its extent, shows similar changes. The choroid surrounds the papilla as usual. The nerve and retina show but slight changes. The iris is adherent to the cornea at its periphery. There is an increase in nuclei about the dilated episcleral vessels.

Comparing the condition in this case with that found in some other cases reported, the marked features common to them all are the alveolar structure of the flat diffuse carcinoma and the presence of carcinoma cells in the vessels. In one case the carcinoma cells seemed to replace the endothelium of the vessels, furnishing a new proof of the metastatic development of endothelium into epithelium,[1] caused by the epithelial infection of the former with the particles of carcinoma carried in the blood. At any rate, we may safely say with Perls that the metastases in those cases are caused by carcinomatous emboli in the choroidal vessels; the alveolar structure is due to the fact that the epithelial masses develop first in the blood-vessels at the point of invasion and spread for a time within the vessel, then break through the walls and spread atypically, causing hyperplastic tissue-changes in the stroma of the choroid. The occlusion of so many vessels leads to atrophy of the rest of the uveal tract and to retrograde changes in the growth itself.

Taking the eight cases together, some interesting facts reveal themselves. The primary growth was located six times in the mammary gland, once in the lung (in a male), and once in the stomach.[2]

All the cases in which an autopsy was made showed numerous metastases in various organs, and always in the liver and lungs or pleura.

Passing Case 3 in which the starting-point of the neoplasm was the nerve, carcinoma of the choroid has appeared in two distinct forms. Twice there has been seen a circumscribed elevated tumor which has quickly destroyed vision. In all the other cases there has been a flat, slow-growing tumor, not causing much visual disturbance until the retina has become detached. This form can be diagnosed with the ophthalmoscope with certainty only before an extensive detachment has occurred. In the cases examined sufficiently early, either yellow or reddish-white spots were seen,

[1] *Vid.* Klebs, "Die allgem. Pathol.," vol. ii., pp. 504 and 771, 1889.

[2] The author refers here to Gayet's case of adenoma of the choroid, not included by some in the category of pure carcinomata of the choroid.—TRANSLATOR.

or flat tumors showing irregular absorption of the pigment epithelium.

To repeat, IN *these cases it is certain that the metastases take place through the medium of the blood-current and that the carcinomatous growth develops first or possibly entirely within the vessels of the choroid.* The location of the growth corresponding to the point of entrance of the short ciliary arteries into the choroid, and its diffuse development in the choroid without involving neighboring parts, strongly support this view.

III.—METASTATIC SARCOMA OF THE CHOROID.

Metastatic sarcoma has been observed far more rarely.

The first case was reported in 1870 by Brömser.[1] One year after the removal of a pigmented tumor which bled readily, having developed from a congenital pigmented nævus, a melanotic sarcoma appeared in the choroid, without a local recurrence of the tumor.

Leber (*l. c.*), who examined the enucleated eye microscopically, considered the tumor metastatic, notwithstanding the objection of Fuchs.[2]

Pflüger[3] described a unilateral metastatic sarcoma of the choroid following a pigment nævus of the right clavicle in a woman æt. thirty, after it had become sarcomatous. The second eye was amblyopic, but no ophthalmoscopic examination was made and no anatomical examination of the tumor.

Notwithstanding the fact that the cases reported of metastatic sarcoma are so few, the relative immunity of the choroid from metastases which Fuchs[4] held, and the statement of Virchow,[5] so often quoted, seem to be disproved. It is questionable further whether, in some of the cases in which a sarcoma of the choroid has been considered primary, it were not in reality metastatic. This applies particularly to those cases in which, after the early removal of a strictly

[1] Ueber einen Fall von secundärem Melanom der Chorioidea, *Inaug.-Dissert.*, Berlin, cited by Leber, *Arch. f. Ophth.*, vol. xxxi., 4, p. 111.
[2] "Das Sarcom des Uvealtractus, 1882, p. 238.
[3] *Arch. f. Augenheilk.*, vol. xiv., p. 129.
[4] *L. c.*, pp. 201, 231.
[5] "Die krankhaften Geschwulste," vol. i., p. 69.

localized melanotic tumor of the choroid, the patient dies from metastases in internal organs; and to those in which tumors appear at different times in the two eyes.

So long as the uveal tract was considered the only location of melanotic sarcoma,[1] and the possibility of the formation of metastatic sarcoma in the uveal tract was excluded, all the cases observed, even those varying from the usual course and aspect, were necessarily placed in this one category. But since the incorrectness of these views is proven, and since many intra- and extra-bulbar melanomata have been observed, which throw suspicion on the common idea of the frightful malignity of sarcoma of the uveal tract, perhaps a number of these cases can be more logically explained by the supposition that *the tumor in the eye is but a metastatic manifestation of a general sarcomatous infection*, whose starting point is to be sought for outside the eye. So long, however, as careful investigations are wanting, and so long as the literature of clearly secondary sarcoma of the uveal tract is so scanty, we can only advance hypotheses, which may serve the purpose of attracting more attention to this point in the future.

Explanation of the Figures.

Fig. 1. The tumor of the optic nerve seen from above (natural size).

Fig. 2. Transverse section through the middle of the tumor (Weigert's stain, slight magnification).

Fig. 3. Longitudinal section through the central end of the tumor (magnification as in Fig. 2).

Fig. 4. The structure of the carcinoma in the middle of the tumor (hematoxylin-eosin stain; Reichert obj. 9, eye-piece III.; drawn with drawing-prism).

Fig. 5. Horizontal section of left eye after the removal of the fibrinous mass filling the subretinal space (natural size).

Fig. 6. Transverse section through the tumor, from the upper half of the ball (hematoxylin-eosin stain; Reichert obj. 5, eye-piece I.; drawing-prism).

[1] von Wecker in *Graefe-Saemisch*, vol. iv., p. 631.

A CONTRIBUTION TO THE STUDY OF THE TUMORS OF THE LIDS.

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(With Fig. 1–10 on Plates IV. and V. of vol. xxii. Germ. Ed.)

ADENOMA.

OF all the neoplasms of the lids, the adenomata have the greatest interest for the histologist. There are few organs which within so narrow an extent are so rich in different glandular structures as the lids. It is therefore not surprising that the adenomatous growths show great variations in structure. Few cases of this sort, however, have been observed and described. I shall report here three cases of adenoma, each of which has developed from a different variety of gland. The preparations are from the collection of Prof. Fuchs, to whom my thanks are due.

I.—ADENOMA OF THE MEIBOMIAN GLANDS.

Antonie P., æt. 80, laborer, was received into the clinic January 5, 1887. She states that a year before she noticed an elevation the size of a pin-head in the middle of the left upper lid.

The left upper lid is now almost entirely involved in a pendant tumor the size of a walnut, which overhangs the palpebral fissure (Fig. 1). The tumor at some points is as hard as cartilage, at others softer; the surface is in some portions smooth, in

others roughened; the color is somewhat yellowish. The skin is not movable over the tumor. The ciliary margin of the lid as far as the outer third, is involved in the tumor, thickened, and without cilia. The lymphatic glands in the neighborhood are not enlarged.

The tumor was removed January 7th, and the wound covered with a quadrilateral skin-flap from the cheek. Healing normal.

The extirpated tumor was hardened in Müller's fluid. It involved the inner two thirds of the lid, being 3.5 *cm* in its greatest height, and 2 *cm* in its greatest thickness.

Sections were made through the middle of the tumor, and also through its outer portion, where the margin of the lid was still in part preserved. The latter sections will be described first, since they are more important in explaining the relations of the tumor than the others.

The skin shows no particular changes. The subcutaneous tissue is thickened and transformed into a fairly tense layer with parallel fibres, containing normal sweat-glands here and there, and a few obliquely-cut hair-follicles. It is not sharply distinguished from the capsule of the tumor, which immediately underlies it. Widely distended veins mark the limit between the two.

The conjunctiva is thickened, vascular, infiltrated with round cells, and shows hypertrophied papillæ over the tumor, but it is only slightly infiltrated over the normal portions of the tarsus.

The tarsus shows the most marked anatomical changes. It is considerably thickened in its upper portion. The Meibomian glands are normal in the lower portion of the tarsus, further up these are compressed and small, and still higher the acini are replaced by lobules of the tumor, which at the sides lie in the normal tarsal tissue, and in the middle pass over into the mass of the tumor. The tumor fills the space between the skin and tarsus above the arcus tarseus, in which region it completely replaces the muscle-fibres and intermuscular tissue.

The tumor proper consists of an aggregation of irregularly formed, branched, anastomosing lobules, separated by connective-tissue septa, the whole enclosed in a connective-tissue capsule (Fig. 2).

The lobules vary in size, exceeding the normal acini of the Meibomian glands ten to twenty times; they are composed of a mass of round or oval cells, mostly polygonal from pressure, with

no intervening substance or supporting tissue and no blood-vessels. The cells resemble the peripheric cells of the normal acini in the relation of nucleus to body, and in their staining properties, although their form and arrangement are irregular.

The central portions of the large lobules show retrograde metamorphosis. The nuclei do not stain, the protoplasm is granular, the margins of the cells become indistinct, and finally the whole degenerates into a granular irregularly-cleft mass, in which here and there a bit of nuclear structure can be distinguished.

Besides this fatty degeneration, other portions of the tumor show a degeneration independent of the former, involving whole groups of lobules with their septa. The nuclei of the epitheloid cells do not stain here; and the connective-tissue cells stain faintly, while their contours remain sharp.

The septa (Fig. 3, *s*) consist of tense parallel connective-tissue fibres with scattered oval or grouped round cells. The periphery of the tumor is covered with a capsule, whose structure is similar to that of the septa. Vessels are rare.

Between the lobules and the septa there are scattered cavities, for the most part empty or containing a few angular cells or amorphous masses. These cells have a different aspect from those of the lobules, their nuclei are smaller, stain less deep and are relatively smaller as regards the cell body. Where the section has passed through both tissues—the epithelial mass composing the lobule, and the septum,—the boundaries of the two tissues toward the cavity are very sharp, and endothelioid cells, some flat, some prominent, lie on either surface (Fig. 3, *e*). These cavities must then be considered lymph spaces, the analogues of those surrounding the acini of the normal Meibomian glands.[1]

In its central portion the tumor has involved the thickness of the lid from skin to conjunctiva, and the degenerative processes are here more advanced.

From the microscopic examination we may make the following deductions as to the origin and development of the tumor:

It appeared first in the upper portion of the lid internal to the middle line. From this point a part of the tumor spread downward and outward, while the principal mass

[1] Czerny, *Klin. Monatsbl. f. Augenheilk.* vol. xii., p. 422, 1874, and Fuchs, "Zur Anatomie der Blut und Lymphgefässe der Augenlider, *Graefe's Arch. f. Ophth.*, vol. xxiv., 3, p. 1.

perforated the tarsus and spread subcutaneously upward over the fornix, and also downward and forward in the intermuscular tissue, which, as well as the fibres of the orbicularis, it has almost entirely replaced. The tumor extends outward over the normal portion of the tarsus, but lies further distant from the margin of the lid, leaving a small bit of margin near the outer canthus free.

Taking into consideration the location of the tumor and its glandular character, there can be no doubt as to the diagnosis. The acini filled with cells and having a lumen only where the central portions have degenerated, are of the type of Meibomian glands. This view receives its chief support, however, from the evident transformation of the normal acini into lobules of the tumor.

We can speak with much less certainty as to the clinical nature of the tumor, since the benign character shown by the microscopic examination contrasts strongly with the rapid development of the tumor. In this regard the case presents a marked variance from those previously observed, in which the tumor developed much more slowly and did not attain so great a size. There have been reported, however, but two cases (Baldauf[1] and Bock[2]), which were proven to be adenomata of the Meibomian glands. In Fuchs'[3] case it could not be determined with certainty whether the tumor had originated in the Meibomian or the sebaceous glands.

In these two latter tumors as in our case there was the characteristic peculiarity that the lobules were for the most part solid, and only contained a lumen after the degenerated products of the cells had collected in the interior. The sharp limitation of the septa from the epithelioid contents, which was almost without exception the rule in our case, seems not to have been found in Bock's case, and cannot therefore be regarded as characteristic for this class of

[1] Baldauf, "Ein Fall von Adenom der Meibomschen Drüsen," *Inaug.-Dissert.* Munich, 1870.

[2] Bock, "Ein Fall von Adenom der Meibomschen Drüsen," *Wiener klin. Wochenschr.*, 1888, vol. i., p. 799.

[3] Fuchs, "Ueber das Chalazion und einige seltenere Lidgeschwülste," *Arch. f. Ophth.*, vol. xxiv., 2, p. 121.

tumors. I limit myself to these remarks, since it would be useless to attempt to sketch a general picture of a variety of tumor from a consideration of but three cases, and I shall only add that in all these cases the patients were women of advanced age.

II.—ADENOMA OF THE TARSAL GLANDS OF KRAUSE (ACINO-TUBULAR GLANDS).

Sylvester D., æt. sixty-five, came to the clinic in March, 1887, with a tumor of the left upper lid which springs from the conjunctival surface of the upper portion of the tarsus about the middle of the lid, and arches the tarsus outward in a saddle form. The margin of the lid is normal. The tumor presents itself in the palpebral fissure as a mass the size of a cherry, of dark red color, its surface rough and uneven, and bleeding readily. The base of the tumor is slightly constricted and covered with conjunctiva. The ball and the remaining adnexa are normal (Fig. 4).

The tumor was removed together with a bit of the neighboring tarsus, and hardened in Müller's fluid.

The portion of the tarsus next the tumor is compressed vertically and distorted so that in a vertical section the ducts of the Meibomian glands are cut obliquely or even tranversely. The capsule of the tumor is a direct continuation of the tarsal tissue which splits and encloses the tumor, being interrupted on the convex anterior surface, where the conjunctiva is also wanting and the degenerating tissue of the tumor is exposed.

The tumor consists of a number of branched and anastomosing glandular tubules, separated by connective-tissue septa. These tubules are of varying form and size, and consist of a smooth or folded epithelial wall enclosing a lumen of varying width. No membrana propria could be discovered.

The greater number of the tubules are thick and have many branches. At some points, however, there are groups of simple tubules representing the most elementary type of adenoma.

The epithelium of these tubules forms a wall of a single layer of cubical or cylindrical cells with oval nuclei, enclosing a considerable lumen. In most cases even the smallest tubules show here and there a second layer of cells which, lying on the inner surface of the first layer, cause an irregular thickening.

These cells with a rounder nucleus represent the first formation of the folds in the epithelial layer, which are so excessively developed in the older tubules (Fig. 5, c). These show numerous teat-shaped epithelial processes, consisting of two rows of cells, not supported by connective-tissue, springing out into the lumen of the tubules, and in places almost occluding them (Fig. 5, d).

The lumen of these tubules is in some instances filled with a mass (Fig. 5, i) which has become coagulated in the process of hardening, and in other instances with partly cast-off and degenerated cells (Fig. 5, f, h). These cast-off cells show numerous small vacuoles which in life were filled with fat (Fig. 5, h). The nuclei are often multiple, but mostly double, and stain dark.

These changes are to be considered a fatty degeneration which as a rule has affected the cast-off cells only, and is to be attributed to the disturbance in nutrition.

The stroma of the tumor (Fig. 5, a) consists of a loose connective-tissue, containing numerous scattered round cells, which is very sharply distinguished from the tissue of the capsule.

The vessels of the tumor lie for the most part in its immediate neighborhood, but here and there in the septa irregular cavities lined with endothelium are found which contain blood.

On its convex free surface the tumor is ulcerated to a considerable extent. The tumor seems to have perforated the capsule here and finally to have broken through the conjunctiva. This extra-capsular portion shows advanced degenerative changes. Deep in this part the connective tissue is increased and the tubules show a marked fatty degeneration, and on the surface there is merely a necrotic mass.

The microscopic examination makes it certain that the tumor had its origin within the tarsus, and since it has a glandular structure it must have developed from the Meibomian glands or the acino-tubular glands. The whole character of the growth is in favor of the latter view, since besides the location it has a tubular character in common with the acino-tubular glands. As the glands of Krause are surrounded by a loose connective-tissue with numerous round cells, which separates them from the stroma of the tarsus, so this tumor was surrounded by a capsule. In places the tarsal tissue extended between the tubules, but this condition is also found in the normal

glands when large masses are surrounded by the tarsal tissue.

There are, I believe, but two cases in literature which are similar to the one just described, inasmuch as they had an epithelial character and the same point of origin. Fuchs'[1] case has less similarity, since there was a proliferation of tubules of a more carcinomatous character, and a more marked participation of the stroma in the process with the formation of cartilaginous tissue.

The case of Moauro[2] is more analogous, as it was a pure adenoma of a very typical structure.

The tumor, of hazel-nut size, was located on the right lower lid of a man of thirty. It projected on the conjunctival surface, and had caused a slight partial ectropium. The skin and muscle over the tumor were normal, and it had its seat in the tarsus.

The base was composed of a dense connective-tissue mass, whose prolongations surrounded the external surface of the tumor and also divided its substance into lobules. The latter were made up of an acinous glandular tissue, imbedded in a delicate reticular connective-tissue containing lymph corpuscles. The acini were of round or oval form, and opened into 2–3 small ducts, which united at acute angles to form larger ducts. All had a distinct basal membrane and a central lumen; the epithelium was everywhere of a single layer, and in the acini the cells were granular and of conical form, with a basal nucleus; the cells of the ducts were cylindrical.

This was a case of new formation of glandular tissue of the most elementary type, *i. e.*, retaining almost all the characteristics of the normal gland, and herein lies its only point of difference from the case reported above, in which there was a proliferation of the epithelial layer, though only within the limits of the acini. The connective-tissue framework preserved its physiological character in all the cases.

[1] Fuchs, *Arch. f. Ophth.*, vol. xxiv., 2, p. 121.

[2] Moauro, "Adenoma delle glandule tarso-conguintivali di Ciaccio," *Revista internaz. di Med. e Chir.*, vol. iv., No. 4, p. 209.

III.—ADENOMA OF THE MODIFIED SWEAT-GLANDS (OF MOLL) OF THE LID MARGIN.

Antonia S., æt. forty-two, was received in Professor Arlt's clinic May 3, 1880.

The patient first noticed the tumor twenty-five years before. For six years the tumor had interfered with vision. A few weeks before her admission she stuck a thorn into the tumor, but no fluid escaped.

In the inner half of the left upper lid is a rough tumor 27 *mm* long, 23 *mm* broad, and 20 *mm* thick (Fig. 6). It is covered for the most part with the thin skin of the lid, and posteriorly also for a slight distance with conjunctiva. The canaliculus is still to be found on the margin between cutis and mucous membrane near the inner end of the tumor. The tumor is partly of hard consistence, partly soft and translucent as if it contained fluid, but at no point is there fluctuation. The outer half of the upper lid, the lower lid, and the ball are normal.

The tumor was extirpated May 4th without much hemorrhage.

A small piece of the tumor was examined microscopically. It shows a poorly-developed connective-tissue capsule, from which a thick septum passes into the tumor, dividing it into two parts. Both parts have an exquisite glandular structure, yet in one the connective-tissue is much more marked, making the appearance less typical.

The smaller part, which contains only so much connective-tissue as is necessary for the support of the epithelial elements, shows in its central portion an irregular cystic cavity, from which pass in all directions branched tubules with blind rounded ends —a single large dendritic gland of tubular character (Fig. 7).

The inner surface of the cavity and tubules is lined with a double layer of cells (Fig. 8).

The cells of the outer layer (Fig. 8, a) are smaller and more closely arranged than those of the inner layer; they are low, cubical, or cylindrical cells, with darkly-stained nuclei, oval in a direction perpendicular to the wall.

The inner layer is composed exclusively of cylindrical cells (Fig. 8, i) of varying height, but all larger than the corresponding cells of the outer layer. Their nuclei are also larger, more or less oval, and stain less darkly.

The connective-tissue stroma (Fig. 8, s) differs in no way from physiological connective-tissue. It consists for the most part of

loose connective-tissue fairly rich in nuclei, and containing a few blood-vessels. Those layers which immediately surround the external layer of cells are of denser structure and have fewer nuclei, representing the membrana propria of the glandular tubules. The most careful examination of the preparations failed to reveal any muscular element in connection with the layers, such as are found in the normal glands of Moll, and only a few isolated smooth muscular fibres were found in the septum.

In the larger part the development of the stroma has been much more marked, and here there is also a wide cystic cavity lined with cells, as in the smaller part. Besides the branched tubules running from this cavity, other glandular tubules are seen often cut obliquely or transversely, and apparently in no connection with the central cavity or its prolongations. These tubules differ from those already described both in form and location, and in the structure of their epithelial lining. The centrifugal prolongations and the dendritic branching are wanting, and a number of regularly-arranged transverse sections of glands are seen in a well-developed stroma.

Both layers of cells have suffered in their development; the outer are reduced to a few flat cells, the inner are better preserved but small and cubical, or flat. The stroma has a denser structure, contains only a few spaces but numerous nuclei, which, arranged in parallel groups, show the stroma to be composed of bundles of young connective-tissue, crossing and interlacing in various directions (Fig. 9). At some points are seen indurated masses of connective-tissue, poor in cells, which send out radiating projections, and thus pass over into the ordinary stroma-tissue (Fig. 10). A dense layer of connective-tissue forming a proper wall of the individual tubules was not found in these portions.

We have here again the characteristic structure of adenoma of the type of a tubular gland. This character and the location of the growth justify us in believing that the origin was in the glands of Moll. There are also other analogies, chiefly in the lining of the glandular tubules. In the normal gland of Moll this is double, the inner layer consisting of cylindrical or cubical epithelial cells, and the outer of endothelial cells.

All these conditions are found: a basal membrane, although not distinct; an outer layer of cells which has lost

much of its endothelial character, but differs markedly from the epithelium of the tubule; and an inner layer of epithelial cells which is similar to that of the normal gland of Moll. The deviations from the normal type of gland which the structure of the tumor shows are chiefly as follows: the tubules show many branches, while the normal glands consist of a single spiral tubule; and the sheath of smooth muscular fibre which surrounds the normal gland is here wanting. The latter circumstance is not surprising when it is remembered how seldom muscular elements take part in acquired neoplasms.

The case was not, however, one of pure adenoma. A cystic formation was caused by the dilatation of particular parts of the tubule, and the greater portion of the tumor shows a typical proliferation of connective tissue, which gives these parts a more fibrous appearance. In the heading I have called this growth an adenoma, since the adenomatous character is recognizable in all portions of the tumor, even in the regions of a typical connective-tissue proliferation, and since the beginning of the tumor was purely adenomatous, the fibromatous parts being certainly a later secondary formation. One glance at a preparation will show that the smaller apparently younger lobule, with the central cavity not so markedly developed, has a pure adenomatous structure, while the larger apparently older lobule, with the more extensive cystic cavity, has a more excessive development of connective tissue, and the more advanced the latter, the more markedly do the grandular parts show signs of secondary atrophy.

According to Klebs such connective-tissue proliferations occur not only with epithelial neoplasms springing from the skin, but also often with adenomata. They may be referred in part to embryonic conditions, and they also depend in part on inflammatory processes.[1]

Although this question is difficult to decide in a given case, I am in favor of the former explanation, for at those points where this proliferation begins there are no signs of

[1] Klebs "Allgemeine Pathologie," vol. ii., p. 740.

inflammatory processes, and although groups of round cells and polynuclear leucocytes are found here and there, these changes are not so marked as I have found them, for example, in most cases of carcinoma of the lids.

As far as I know, no case altogether similar has been reported.

If it be now asked what practical purpose these descriptions and considerations serve in the matter of diagnosis and prognosis, it must be admitted that the clinical symptoms are not so characteristic that an accurate diagnosis can be made from them alone. In no one of the cases which I have reported was the correct diagnosis made before the microscopic examination.

In general, the adenomata of the lids seem to be characterized by benignity and slow growth; a striking example is Case III., in which the first appearance of the growth was twenty-five years previous to the operation. In the cases of Baldauf and Moauro, the period was four years; Bock merely makes the general statement that the tumor had existed for years. In Case I. it had developed within a year.

Besides these points, the location and the direction of development may be of diagnostic value in some circumstances. The adenoma beginning in the tarsus will have a certain similarity to chalazion, yet a consideration of the duration of the disease, the size of the tumor, and the appearance of the inner surface of the lid where the gray contents of the chalazion are not seen through the conjunctiva, will make the differential diagnosis. Tumors springing from the orbital margin of the tarsus, and prominent on the inner surface chiefly, have probably originated in the glands of Krause. Adenomata of the Meibomian glands develop sometimes more on the conjunctival side, sometimes more on the cutaneous side, and as a rule attain a larger size than the tumors of the glands of Krause.

The chief point in the diagnosis of adenoma of the glands of Moll is the origin of the tumor in the region of the roots of the cilia.

Adenoma of the lid is in most cases only diagnosed by the microscope. Perhaps these lines will direct the attention of

ophthalmologists to the diagnosis of these tumors. My observations have shown that adenoma may develop from each sort of gland that the lid contains. Considering the number of these glands, the adenomata springing from them cannot be so rare as has been hitherto supposed.

Explanation of the Figures on Plates IV. and V.

Fig. 1. I.—Adenoid of the Meibomian glands.

Fig. 2.—Section through the periphery of the tumor. Reichert obj. 2.—h, skin — k, capsule — s, septa — e, the solid glandular tubules, separated from the septa by empty spaces.

Fig 3.—From the middle of the tumor. Reichert obj. 8a — s, septum — l, lymph space, at l′ partly lined with endothelial cells — e, pathological glandular cells.

Fig. 4. II.—Adenoma of the glands of Krause.

Fig. 5.—Part of a large glandular tubule. Reichert obj. 8a — a, stroma — b, single layer of epithelium — c, double layer of epithelium — d, epithelial process, cut longitudinally — e, a similar process cut transversely — f–h, cast-off cells — i, detritus and amorphous contents.

Fig. 6.—Adenoma of the glands of Moll.

Fig. 7.—From the periphery of the tumor. Reichert obj. 4. Branched glandular tubule with regular lining of cells.

Fig. 8.—The part marked x in the preceding figure. Reichert obj. 8a — i, inner layer of cells — a, outer layer of cells — b, basal membrane — s, stroma.

Fig. 9.—From the portion with fibromatous structure of recent date. Reichert obj. 8a — s, stroma with numerous nuclei — t, glandular tubule, in which only the inner layer of cells is preserved.

Fig. 10.—From the portion with fibromatous structure of older date. Reichert obj. 8a — s, stroma relatively poor in nuclei — t, atropic glandular tubules.

TWO CASES OF HEMIANOPSIA WITH AGRAPHIA, AMNESIC APHASIA, AND ASSOCIATED SYMPTOMS.

By Dr. JOHN E. WEEKS.

SURGEON TO THE N. Y. EYE AND EAR INFIRMARY.

(With six wood-cuts.)

Mrs. E. S.,[1] age thirty-nine years. Patient has given birth to four children at term, and has had five still births; two of the children are now alive, the others died of non-hereditary diseases. There is no history of syphilis. The family physician can assign no cause for the still births. The confinements were all very difficult, and were in almost all cases assisted with instruments.

On May 24, 1887, Mrs. S. was delivered of a child at full term. The forceps were used, and there was some laceration of the tissues. Recovery was progressing favorably when, on June 2d, a fire occurred near her apartments, alarming her, causing her to leave her bed and to descend to the street. After walking a short distance her vision failed and she stumbled to the flagging, but did not lose consciousness. She was assisted to her apartments and returned to bed. Patient slept but little during the night. No convulsions, no pain in the head. Twelve or eighteen hours after her fall she noticed partial loss of power in the extremities of the left side. This was gradually and completely recovered from. A defect in the vision persisted, and on December 9, 1887, my friend, Dr. S. Hemingway, kindly sent the patient to my office for an examination of her eyes. The patient was then in good health, with nothing abnormal in her mental or physical condition, except slight anæsthesia of the left side. The points of the æsthesiometer were recognized at half the distance on the

[1] Reported before the Section on Neurology, the N. Y. Academy of Medicine, December 14, 1888.

right side that they were on the left (the affected) side. Electrical reaction of muscles normal. No disturbance of patellar or other reflexes. Examination of the visual field showed left-sided homonymous hemianopsia. The rough test of comparison with my own eye indicating that the dividing line was vertical. The vision was $\frac{18}{18}$ in both eyes. Color perception normal in the seeing halves. The fundi were normal in appearance. December 27th.—Examination of the urine shows a trace of albumen ; no sugar ; sp. gr., 1027.

On August 16, 1888, the patient gave birth to a child at full term. Forceps delivery, with slight laceration of vaginal tissues. Recovery progressed favorably up to the afternoon of August 21st, when, while sitting up in bed conversing with her sister, the patient remarked a failure in vision, complained of a strange sensation in her head, laid back on her pillow, and gradually passed into an unconscious condition. There were no convulsions, but during the night the patient muttered unintelligible sounds. She would swallow liquids that were given to her, but the cup had to be placed to her lips. Toward morning when disturbed to take medicine or nourishment she would become excited, weep, and give utterance to disconnected sounds. This condition continued during the day. She rested quietly during the following night.

August 23d.—Patient was quiet during the day ; when spoken to she was unable to understand what was said. Her power of speech was limited to the pronounciation of a few such words as "what" and "yes." Toward evening she could articulate two or three words in succession, as "what then ?" "what is it ?" not, however, as sensible answers to questions. She could not recognize any person or thing by vision alone, but could apparently see objects, and on the morning of August 24th would ask "who 's that ?" or "What is that ?" and when told would indicate by nodding the head and saying "Yes, yes," that she recognized the object. At the request of Dr. S. Hemingway I saw the patient on the afternoon of August 24th. I approached her from the right (seeing) side, but although her attention was fixed on me and she evidently saw me she did not seem to know what or who I was until my name was spoken. She did not recognize familiar objects that were held up to her view until the name of the object was pronounced by some person in her hearing After two or three attempts she could herself pronounce the name. Although the name of the object was recognized she stared at and seemed to

study the object as though its shape was strange to her and did not call up the memory of anything that was familiar. I considered this condition to be one of mind-blindness. It gradually passed away. The patient was able to recognize objects in four or five days after the seizure. For about forty-eight hours, beginning about twelve hours after the seizure, Mrs. S. could hear people moving about the room and all accidental sounds, but did not appear to comprehend the meaning of spoken language. The condition is that known as word deafness—the pseudo-aphasia of Broca, and was very transient. The function of the memory centre for spoken language was restored much sooner than that for visual impressions. Tests of the hearing made on the 24th of August showed that to be nearly normal on both sides. There was no paralysis. No anæsthesia of the skin on the left side. No cardiac lesion. Pulse and temperature normal. The interior of the eyes was normal. The left-sided hemianopsia persisted.

On September 12th the patient was found to be about her rooms performing the lighter domestic duties. She recognized me immediately on my entering the room, but could not remember my name. Objects were now readily recognized by the visual sense, but were named with difficulty, two or three attempts being usually required before the correct name could be spoken. If the correct name were given her either by voice or in writing, she would immediately recognize it as such, and would repeat it correctly if spoken ; if written she might again mispronounce it. Examples of mispronunciation : A pencil was called "muspel" ; a horse "sorse" ; a slate "slip" ; an envelope "elpolpe" ; cotton "scolly" ; a needle "memadople" ; glass "glopp." The patient reads without more difficulty than that experienced by all left-sided hemianopes. She can neither write, copy, nor draw the form of the simplest object—complete agraphia. Senses of taste and smell normal. She does not remember events that transpired during the first twelve hours of her last seizure. The memory is now about normal for events before and since that time.

September 20th a perimetric measurement of the field of vision showed the dividing line to pass along the perpendicular meridian. At the point of fixation the line described a curve passing into the blind half about three degrees. There are two small defects in the seeing half of the right visual field which are shown in the chart of December 9th.

December 9th.—The patient experiences less difficulty in naming objects correctly. She speaks correctly, but often supplies the place of the proper word by one that is meaningless in the con-

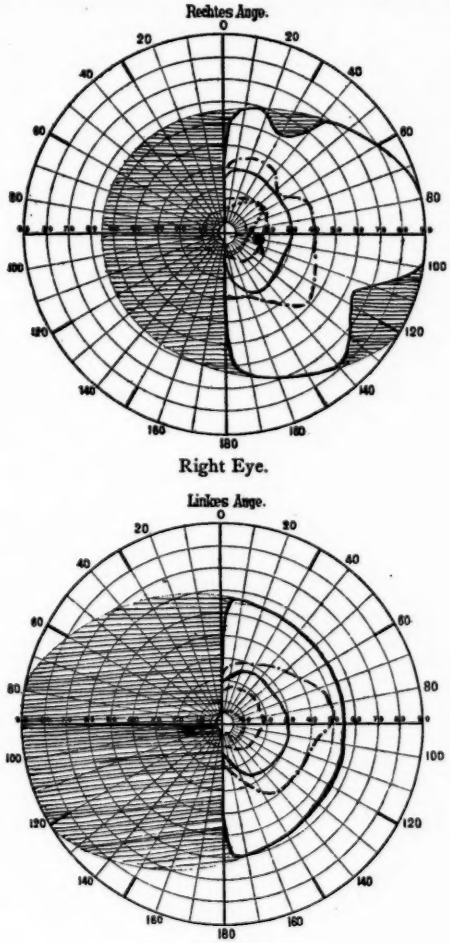


FIG. I.

nection. She recognizes the error and endeavors to correct it. She cannot perform even the simplest mathematical problem;

cannot count beyond four or five. There is no loss of muscular power.

A second perimetric measurement of the fields of vision was taken (see charts). The defects in the periphery of the temporal half of the field of the right eye indicate, to the author's mind, implication of a small portion of the cortical visual area of the left hemisphere.

In March of 1889, Mrs. S. had another attack consisting of partial loss of muscular power on the *right* side, followed in two or three weeks by *paresis* of the muscles of the tongue and lower part of the face on the *left* side. The hemiplegia passed away in a very short time, but the facial paresis remains. There were no convulsions, no loss of consciousness.

I saw the patient again on May 15, 1891. At that time the vision and fields of vision were as when last recorded. The agraphia remained unchanged, the amnesic aphasia was much less pronounced. Memory for past events was good. She could not count the strokes of the clock above three. Hearing, taste, and smell normal. There was paresis of the muscles in the lower part of the face on the *left* side; the tongue deviated to the left side when protruded. Partial atrophy of the adductor pollicis, flexor brevis pollicis, and interosseus between the first and second metacarpal bones of the *right* hand was observed. Constant chilly sensations in the back and shoulder of the *left* side were complained of. Anæsthesia of both sides was noticed. June 13, 1891.—Perimetric measurement of the visual fields shows but little change. Vision $= \frac{20}{50}+$. No change in the interior of the eyes. Mental and physical condition as on May 15, 1891. The pupils react to light, whether projected on to the right or left sides of the retinæ, and to efforts of accommodation. A careful examination convinces me that the word deafness (sensory aphasia) is not entirely recovered from. An examination of the urine made June 20, 1891, shows a few granular casts; there is no albumen, no sugar. Sp. gr. 1018.

The diagnosis and discussion of this case will follow the report of the second case.

Second Case.—Mr. F., male, age sixty-five years, American, apparently of average intelligence, was admitted to the Alms House Hospital about January 1, 1891, on account of a right-sided hemiplegia. My attention was called to him soon afterward. The following history was obtained: Patient had been a

perfectly healthy man, so far as he knew, up to about fifteen years ago, when he experienced paralysis of the right side (leg and arm); this passed away in a short time. About ten years after the first attack the patient experienced a second attack of like nature. He claims not to have lost consciousness during either of these attacks, and says that his speech and vision were not materially interfered with. A short time before he was admitted to the Alms House, which was in December, 1890, he experienced a third attack. At this time his vision became somewhat impaired, his speech much affected, and he was unable to write. There was no history of syphilis or of rheumatism.

At the time of my first examination I found a defect of the visual fields consisting of a right-sided homonymous hemianopsia; the vision was sufficiently good to enable the patient to read ordinary newspaper print readily with either eye.

A subsequent more careful examination showed the vision to be $\frac{20}{30}$ + in both eyes. The dividing line between the seeing and the blind halves of the visual fields was vertical, except at the maculæ where the seeing half extended into the blind half about five degrees. Except possibly a slight paling of the nerves in the halves corresponding to the blind sides, there was no change in the interior of the eyes. The movements of the eyes were normal: pupils of equal size, reacting to the stimulus of light and of accommodation. Speech was interfered with to some extent; articulation was jerky, and there was evidently difficulty to think of the word desired to express his meaning, occurring in the middle of a sentence. Difficulty to remember the names of familiar objects,—amnesic aphasia,—was marked. If an object, a pencil or a watch, was shown to him, and he was asked its name, he would always fail to give it. However, when he heard the correct name pronounced, he would immediately recognize it as correct. There was no sensory aphasia, no mind blindness, and no alexia, or inability to read. There was complete agraphia. The form of the simplest object, as well as that of the letters of the alphabet, could not be represented with the pen or pencil. The pencil would be grasped as usual, and an extreme mental effort would apparently be made to draw the form; but meaningless marks only would be the result of his endeavor. Motor aphasia, inability to pronounce only a few short words, as "yes" and "no," developed during the last two weeks of life. The hemiplegia had been recovered from, to the extent of enabling the patient to walk

about and to use the arms a little. He experienced difficulty in raising the right arm above the head. There was no deafness. The senses of taste and of smell were normal. There was no hemianæsthesia.

Death from congestion of the lungs, accompanying la grippe, occurred on April 26, 1891. Autopsy by the House Physician.

The lungs were found to be deeply congested, the congestion amounting almost to consolidation. Heart hypertrophied; liver and spleen apparently normal; kidneys of the small granular variety. On opening the cranial cavity, it was found to be of normal size. The right hemisphere was of normal size and consistency; the left hemisphere was much reduced in size. The portion of the cavity not filled by brain substance was occupied by a fluctuating mass, which proved to be a sub-pial cyst, apparently having its origin at the beginning of the fissure of Sylvius. A thin layer of the cortical brain substance from the anterior extremities of the first and second temporal convolutions was raised with the pia forming a portion of the outer wall of the cyst. The pia was also raised from the posterior aspect of the occipital lobe. Shortly after the removal of the brain, the cysts collapsed, and a reddish serum escaped. The brain was placed in alcohol.

After a few days I removed the pia, exposing the convolutions to direct view. The right hemisphere and cerebellum were normal in appearance. The left hemisphere was reduced to about three fifths of the volume of the right. The upper, middle, and anterior two thirds of the lower frontal, the ascending frontal and parietal, except their lower extremities, the supra-marginal, supra-parietal and the uncinate convolutions, as well as the convolutions on the medium surface, back as far as the parieto-occipital fissure, were nearly, if not quite, of normal size. The isle of Reil, posterior third of the lower frontal, lower extremities of the ascending frontal and parietal convolutions, the temporal and occipital lobes and the cuneous, were shrunken and atrophic. The occipital lobe was reduced to about one fifth of its normal size. In the shrunken portions of the brain the diminution in volume appeared to take place largely at the expense of the grey matter. Except in the occipital lobe, where the white matter was also involved, the tissue here was of a reddish hue. There was one focus of softening measuring about 1 *cm* in diameter, located in the white substance of the occipital

lobe, immediately beneath the cortical layer. The shrinkage of other parts was unattended with softening. There were no evidences of hemorrhage into any part. The left crus cerebri was much reduced in size. On examining the arteries at the base of the brain, atheromatous plaques were found occurring at

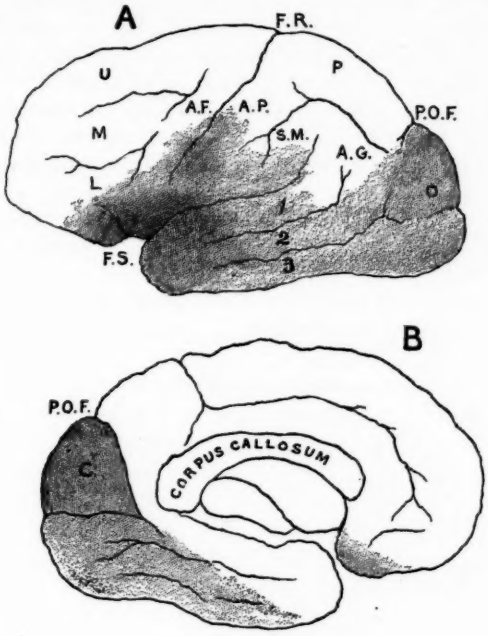


FIG. 2.

Mr. F.—A. External surface. Affected part shaded.
B. Internal surface.

frequent intervals in the basilar artery. At the termination of this artery there was a dilatation, apparently a beginning aneurism. The lumen of the posterior communicating arteries was not interfered with. The posterior cerebral artery on the left side was much reduced in size in the portion extending from near its origin to a distance of about one inch. Cross section shows the lumen to be abolished at some points. The artery here resembles a cylinder of connective tissue ; beyond, the lumen of this artery and its branches are almost normal in size. The same state of

affairs was present in the middle cerebral of the left side, except that a very small opening apparently existed throughout the entire consolidated portion.

Microscopical examination of these vessels shows fibrous thickening of the intima occurring between the elastic lamina and the endothelium. In the posterior cerebral artery this fibrous layer fills the lumen of the vessel. The elastic lamina is seen near the surface of the vessel. The endothelium is crowded at the centre surrounding a very small canal, the contracted lumen. Spaces in this new-formed fibrous mass occur, which are filled with what appears to be fat crystals. The term arterio-fibro-sclerosis has been applied to this condition. It probably originates from some form of endo-arteritis. A complete and probably permanent closure of the lumen of the posterior cerebral occurred at the time of the production of the hemianopsia. The obstruction to the flow of blood through the middle cerebral was evidently not complete, although the lumen of the vessel was greatly reduced. The areas involved are shown in the accompanying figure.

The symptoms manifested in this case, briefly enumerated, are as follows: 1. Homonymous right-sided hemianopsia—left occipital lobe. 2. Amnesic aphasia—isle of Reil. 3. Agraphia—isle of Reil and posterior part of lower frontal convolution. 4. Partial loss of power in the right side, in the upper extremity particularly; motor area of the left side greatest in the middle third of the ascending frontal and parietal convolutions.

The *first* case, briefly summarized, presents the following conditions:

A. Due to lesions on the right side: 1. Homonymous left-sided hemianopsia—occipital lobe. 2. Paresis of the muscles of the lower part of the face, and the tongue on the left side—lower third of ascending frontal and parietal convolutions. 3. Anæsthesia (partial) of the left side; affection of the motor area. 4. The transcient hemiplegia due to temporary derangement of the motor area.

B. From lesions on the left side: 1. Word deafness—posterior third of first temporal convolution. 2. Mind blindness—region of the angular gyrus. 3. Defects in the visual field of the right eye—anterior part of visual area,

occipital lobe. 4. Amnesic aphasia—isle of Reil and vicinity. 5. Agraphia—isle of Reil and posterior third of lower frontal convolution. 6. Right-sided hemiplegia—motor area. 7. Anæsthesia of right side—motor area. The permanent defects, from lesions in the *right* hemisphere, are hemianopsia, paresis of the lower part of the face and tongue, anæsthesia. From lesions in the *left* hemisphere, small defect in the visual field, amnesic aphasia, agraphia, anæsthesia.

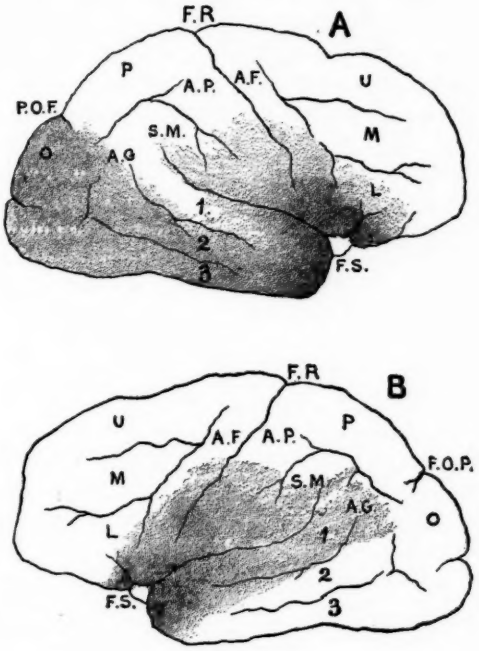


FIG. 3.

Areas probably affected, shaded.

A. Mrs. S.—Right hemisphere. B. Mrs. S.—Left hemisphere.

In the light of reported observations of Wernicke, Charcot, Bernard, Gowers, and others, as well as that afforded by the autopsy in the second case reported in this article, it is safe to infer that the disease of the vessel walls is the prime

factor in producing the symptoms in the first case. The middle and posterior cerebrals are probably the seat of an endoarteritis, which has produced a narrowing of the lumen of the vessels and a condition favorable to the formation of thrombi. The first attack was apparently due to an embolism of the posterior cerebral artery on the right side, the embolism originating from her puerperal condition. It is, however, more probable that it was due to the formation of a thrombus, which caused complete occlusion of that vessel. The slow development of a left-sided hemiplegia, such as occurred with the first attack, would favor this hypothesis, as the occurrence of an embolism in the middle cerebral would produce a sudden not a slowly developing loss of power in the opposite side. The occurrence of two of the attacks during the puerperal state is also in favor of this hypothesis, since the puerperal condition disposes to thrombotic processes. There is also in the development of the facial paresis and the extensive anæsthesia, evidence of the slow advancement of the brain affection, which disease of the arterial walls would best explain. In case No. 2 the establishment of collateral circulation through the anastomoses with the anterior cerebral artery appears to have aided in restoring the functions of a portion of the motor area. Either collateral circulation or the re-establishment of the lumen of the middle cerebral, in whole or in part, has served to accomplish the same work in the first case.

The theory of Kussmaul, that agraphia and aphasia occur only as a result of lesions in the left side in right-handed persons, is admirably supported by the first case, as in this case we have a lesion of the area on the right side corresponding to the area for speech and written language on the left side. The lesion on the right side occurred first, but produced no disturbances of speech. The second case is also in confirmation of the theory of Kussmaul.[1]

[1] The brain described in the second case is preserved in the collection of the N. Y. Eye and Ear Infirmary.

ON TRAUMATIC DIALYSIS (DETACHMENT AT THE ORA SERRATA) AND SECONDARY INVOLUTION OF THE RETINA.

By Dr. OTTO SCHEFFELS, of Crefeld, Germany,

FORMERLY HOUSE PHYSICIAN OF THE OPHTHALMIC HOSPITAL, WIESBADEN.

(With one cut and Fig. 14 on Plate V. of vol. xxii., German edition.).

Translated by Casey A. Wood, of Chicago.

THE retina is firmly attached to the underlying tissues in two localities only—at the papilla and at the *ora serrata*. Throughout the remainder of its entire area it is quite loosely applied to the choroid beneath. In these situations the occurrence of retinal detachment with or without tearing of the tissues, is a common clinical and anatomical observation. On the other hand, it is very rarely observed in the afore-mentioned places where its subretinal attachments are firm and intimate.

Cases of total separation of the membrane from the papilla are quite uncommon. Pagenstecher and Genth[1] have pictured two such instances in their atlas (plate xxviii., Fig. 4 and 5). In both cases this detachment was the result of connective tissue contractions within the retinal "umbrella." In the same way, secondary detachment in the region of the *ora serrata* may also occur.

Sometimes, as Beer points out, it may follow operative interference in glaucomatous (tumor) and staphylomatous conditions. Sometimes choroidal hemorrhages, as well as subretinal effusions, when these forces are not neutralized

[1] "Atlas der pathalog. Anatomie des Augapfels," Wiesbaden.

by a corresponding counter-pressure, result in separation of the retina from the *ora serrata.* In Professor Pagenstecher's collection are preparations of two sarcomata of the choroid which illustrate this. In each case an iridectomy had been made to relieve the glaucomatous tension, but a choroidal bleeding occurred, the retina presented and eventually healed in the wound.

The accident is not, however, always produced by the *vis a tergo;* it may follow directly from an external injury. In support of this contention, I offer the following anatomical report, two clinical histories, and the accompanying illustrations, all of which, with the exception of the history of the second case, I have obtained from Professor Pagenstecher, who has kindly authorized me to publish them.

N. N., æt. thirty-five, ten days before coming to the hospital received a thrust from a cow's horn in the left eye. Severe pain, hemorrhage, and complete blindness immediately followed.

Present condition. Left eye somewhat smaller than normal and much congested. Stretching from the sclero-corneal junction 10.5 *mm* outwards is a slightly depressed, pigmented scar. Iris prolapsed in angles of wound. Cloudy cornea and anterior chamber nearly filled with blood. Total blindness. Right eye normal.

Enucleation of left eye, which was hardened in Müller's fluid and examined nine weeks later. Horizontal section of the bulb into an upper and lower half. Blood-stained fluid, which quite filled both vitreous and anterior chamber, escaped. Antero-posterior diameter, 2.25 *cm;* transverse diameter, 2.37 *cm.* Central portion of cornea very thin, but towards its periphery, especially in the region of wound, noticeably thickened. The wound is closed, closure being effected mostly by superimposed conjunctival tissue. Its margins are slightly turned in; the corneal portion somewhat more than the scleral, so that the latter is overlapped by the former.

The edges are not in immediate contact, but are separated from one another by the intervening iris, which, although prolapsed into the wound, still retains its connection with the ciliary body. Apart from this, and in the lower half of the bulb, is to be seen a torn irregular segment of the iris. This is about 8 *mm* long, and is pushed backward over the *corpus ciliare.* In the

superior half of the globe the iris is entirely wanting. Only in the neighborhood of the wound can the individual ciliary processes be plainly seen and distinguished from one another. The remaining and much larger portion of them is concealed below by closely adherent blood extravasation, and above by a delicate, fine-fibred hazy tissue, which clothes the ciliary processes like a membrane, and extends as a tangent in an oblique direction to the upper angle of the wound into which it is healed. There is no trace of lens or vitreous. *Pars ciliaris retinæ* almost entirely absent, except at a small area, 7.5 *mm* wide, which almost exactly corresponds to the locality of the wound. Nearly the whole circumference of the retina is detached from the *ora*, and in places is rolled up inwards. Only in isolated patches, especially where the *pars ciliaris retinæ* is still to be seen, does the retina retain its connection with the *ora serrata*. Here and there the detachment extends in folds to the equator, otherwise it lies along the choroid. There are no hemorrhagic extravasations in the retina; indeed, with the exception of some thickening at the yellow spot and in the macular region, it presents a normal appearance. Microscopically, thin transverse sections show the retina to be cloudy throughout—due to a molecular fine-celled infiltration.

The changes in and about the macula lutea affect by preference the external and intermediate granular layers. It is an œdematous affection of these parts with thickening of Müller's fibres, where also the molecular cloudiness is most pronounced. The choroid is somewhat thicker than normal, under the microscope the pigment layer is in places loosened from its connection with the elastic lamina by a gelatinous exudation.

If we examine more closely this rare form of injury we can very readily arrange the facts as follows: in consequence of the penetrating wound the eyeball has been ruptured at the sclero-corneal junction; dialysis and partial prolapse of the larger segment of the iris; collapse of the remaining portion; complete escape of the lens and vitreous; in consequence of the latter accident forcible dragging upon the *ora serrata;* extensive detachment of the *pars ciliaris retinæ* with its pigment layer; widespread separation of the retina from the *ora serrata* with a rolling in of the former.

These observations will, perhaps, assist in explaining the cases figured in the "Pagenstecher and Genth's Atlas," plate xxviii., 6, where, in all probability, there had been an injury followed by complete dialysis of the retina at the *ora serrata* with subsequent total involution of the former so that eventually the retina took the form of a pedunculated growth arising from the optic disc.

The following histories are of two cases, the one of a partial and the other of an almost complete separation of the retina at the *ora serrata*, as shown by an ophthalmoscopic examination:

P. W., æt. thirty-five, peasant, seen for first time November 21, 1876. Two days previously received a blow with a stick in the right eye, followed by total loss of vision. With the exception of a recent scar over the superciliary ridge and a slight swelling of the upper lid there is nothing worthy of notice in the tissues surrounding the eye itself. There is a faint conjunctival and subconjunctival injection; cornea clear; no wound to be seen. The anterior chamber is more than half filled with blood. Above is a distinct iridodialysis, and in the same region the pupillary border shows an irregular rent. Tension somewhat increased, V = fingers at three to four feet. Admitted. Treatment with Heurteloup's leech and atropine.

Atropine stopped after eight days. Artificial leech used five times at intervals of five days with marked improvement in vision. Floating opacities in vitreous. Eserine daily for eight days decreased tension. Patient discharged December 24th V with $-\frac{1}{24}$ = $\frac{10}{10}$ and Jäger 5.

Jan. 20th.—Condition about the same. Eye quiet with V = $\frac{10}{30}$. Mydriasis ad maximum. Transparent lens; vitreous not so cloudy. Fundus normal except at inferior periphery where the retina is hazy, corresponding to a defect in the upper field.

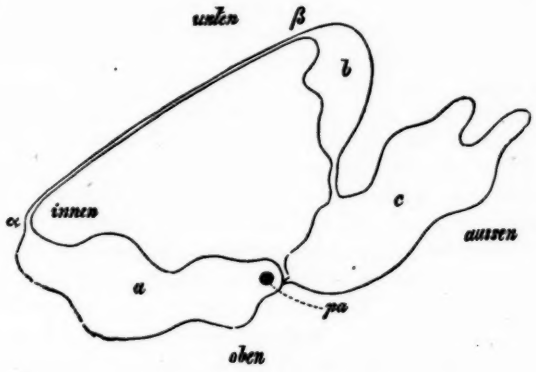
Feb. 7th.—Condition same, with $-\frac{1}{36} \supset$ cyl. $-\frac{1}{48}$ V = $\frac{15}{20}$ $-\frac{15}{18}$.

April 30, 1889.—Patient returned at our request. V = hand-movements at 1 meter; iridodialysis above; tremulous iris; numerous posterior synechiæ; hypermature, shrunken cataract. Visual field everywhere accessible to light. T. normal.

Patient relates that his sight began to fail in the beginning of 1880, and that for the last five or six years it has remained

the same. Has never had any pain in the eye. He declined operation.

The foregoing case was undoubtedly one of circumscribed separation of the retina from the *ora serrata*, an essential retino-dialysis. Its limited extent made it unlikely that the retina would float away from the bulbar wall and made it impossible to curl up. Unfortunately the subsequent occurrence of cataract prevented us from making a comparative examination of the fundus after a lapse of thirteen years.



Gertrude W., æt. thirty-eight, on March 20, 1889, while pruning vines was struck in the left eye by a flying twig. This accident was immediately followed by severe pain in the organ and dimness of vision. She came under our care ten days after the injury.

V = doubtful recognition of hand movements in the upper visual field; no p. l. in the lower quadrants; nothing abnormal either by external or by focal examination. Media absolutely clear. When the patient looks straight forwards and slightly downward a peculiar, grayish-white, wavy object is seen whose details are not readily distinguished. The direct examination (best with + 1/3) shows this to consist of minute folds and coils but no vessels. By the inverted image a striking picture is seen. I regret that it is not possible to represent it by a colored drawing but I trust that my description and the above sketch may help to elucidate the matter.

Not only was the optic disc invisible, but the pupillary area (p. *a*) was hidden by a projecting, easily movable, slightly cloudy, and bladder-like body of a bluish and translucent appearance, whose greatest width was from right to left. At its highest point it measured a disc diameter and a half. Upper and lower borders of the bladder curved sharply backwards. Inwards and somewhat upwards it spread out and covered an area three or four times larger and its surface presented an array of grooves, folds, and processes but no trace of vessels or hemorrhages. Further downwards and inwards (at *a*) the margins of this vesicular body rapidly approach one another, and are continued as a broad choroidal rupture about ¼ d. d. wide, of characteristic appearance, but its course is very unusual, as it stretches outwards and downward obliquely across the periphery of the fundus to (*B*) and joins a smaller vesicle (*b*). As shown in the diagram this smaller body is connected by a pedicle with a larger one (*c*) which is itself divided into two parts by a sort of constricted groove. This bladder-like body (*c*) closely resembles, in size and appearance and other particulars, the one first described (*a*). These are finally joined near the papilla by a delicate fold.

No retinal blood-vessels can anywhere be discovered either in the vesicles or elsewhere, although the choroid in all its details is plainly to be seen.

It may consequently be assumed that the retina has been completely torn away from the *ora serrata*, and has been centrally coiled upon itself. In explanation of the absence of retinal vessels, I would say that when the retina was turned inwards, only the external layers of the membrane were exposed, and that even a slight cloudiness of these sufficed to prevent an ophthalmoscopic view of the blood-vessels.

If we analyze this case we must conclude that the blow from the flying branch sharply compressed the eyeball in its antero-posterior diameter, and as suddenly lengthened its transverse diameter. This action was immediately followed by a stretching of the coats of the bulb. The tough sclerotic and the choroid, loosely attached to the subchoroidal tissue, were able to stand the strain. There was no considerable rupture of the choroidea or counter-rupture of the sclera, but the retinal tissue could not withstand this sudden alternate pressure and stretching; it gave way at its

point of attachment to the choroid in the region of the *ora serrata*. Subsequently the contraction of its elastic limiting membrane brought about an involution of the detached retina.

Cases of retinal detachment at the *ora serrata*, the result of penetrating wounds of the bulb or of extensive ulceration of the cornea where lens and vitreous are extended, have been known.[1]

Examples of retinal dialysis with loss of the bulbar contents, are much rarer. I have been able to find two instances only, both of which were, however, accompanied by dislocation of the lens and laceration of the zonula. Fuchs[2] mentioned one of these accidents following an attempt at discission and reclination of a *cataracta aridosiliquata*. The detachment inward and downwards was visible through the coloboma of a preliminary iridectomy. Berger[3] also describes a prolapse of the retina into the anterior chamber with posterior laceration of the lens following a blow from a pitchfork.

On the other hand I do not find a single description of retinal dialysis apart from the dislocation of the crystalline and laceration of the zonula. We may, consequently, regard our first case of partial traumatic dialysis of the retina and iris, and the second, where there was a complete dialysis of the retina, as unique in literature.

[1] *Vide* "Stellwag's Ophthalmologie," Bd. i., § 713, and Bd. ii., § 552.
[2] *Klin. Monatsb. für Augenheil.*, December, 1877.
[3] These ARCHIVES, xvi., p. 26.

THREE CASES OF COLOBOMA OF THE IRIS.

FROM PROFESSOR FUCHS' KLINIC IN VIENNA.

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(With figures 11, 12, 13 on Plate V. of vol. xxii., Germ. ed.)

ALTHOUGH coloboma of the uveal tract, directed downwards or downwards and inwards, is comparatively common, this defect is so rare in other situations that the following cases are deserving of special mention.

The first two were very kindly placed at my disposal by Professor Fuchs.

1.—Marie K., æt. fifty. Right eye normal; left affected since birth by a coloboma directed in-and-up. Pupil and coloboma together have the form of a pear (Fig. 11) whose smaller end is directed towards the ciliary border. At the corneal junction a small remnant of the iris is to be seen. The circle of the iris becomes less plainly marked as it gradually approaches the coloboma proper and finally disappears at the root of the defect. The structure of the iris itself is well defined. A cataractous lens prevents a good view of the fundus.

2.—J. S., æt., seventy-six, says she has always had good eyes, that the left has never been subject to an inflammatory attack, and that the defect in this eye has been there her whole lifetime.

There is an almost mature senile cataract in each eye. Although in other respects the right eye seems to be normal, the left iris has an atrophic appearance throughout. At a first glance

there appears to be a segment entirely wanting, but a more careful examination reveals an irregular pupil stretching upward, and with the exception of a (at *a*, Fig. 12) small section where it appears to be free it is everywhere joined by a grayish membrane to the anterior capsule. This membrane is also carried upward, exposing only the superior border of the pupil. This latter invests the edge of the gray membrane with a line of dark pigment deposits, which lie on the anterior capsule, in the form of small, tongue-like processes. In the direction upwards from the gray membrane the anterior layers of the iris, as a result of atrophic changes, are represented by scattered remains only, which, for the most part, appear to belong to the posterior layers.

The following is a case of my own:

3.—B. H., aged thirty-two. With the exception of an upward-inward displacement of the pupil the right eye is entirely normal, but the left is small and undeveloped in all its parts. The lower-outer third of the cornea is the seat of a dermoid tumor about the size of half a bean. When the eye is closed the growth occupies a portion of the interpalpebral aperture, and where it touches the upper lid there is a slight defect in the margin of the latter, indicating the site of a small coloboma. The pupils of both eyes are symmetrically eccentric. The temporal half of the left is very black, and the pupil itself reacts promptly to light. The free border of the iris presents to the unaided eye the fine linear and dotted elevations (the so-called "grapeseeds") which are seen in the horse's eye. The intermediate portion of the pupil is filled, or rather replaced, by a very white and compact membrane (Fig. 13). That part of its free margin which presents towards the corneal centre is disposed like a screen behind and almost at right angles to the plane of the iris, and both above and below is slightly curled forward upon itself. It then becomes quickly smaller and as a horizontal process stretches across the iris to the limbus corneæ. Shortly before it reaches the corneal periphery it gives off a delicate branch and in this way isolates a segment of the iris, but appears to have no attachment to the anterior surface of the latter. Although the iris enclosing the normal half of the pupil closely resembles the dark-brown hue of the other eye, and all its details are readily made out, the entire middle half is of a yellow ochre color. It is not noticeably atrophied and exhibits such a uniform appearance that none of its minutiæ can be pic-

tured. The fundus, as far as it can be seen through the small pupil, is normal.

From the capillary margin there extends, towards the left supra-orbital foramen, a zone (about 2 *cm* long and ½ *cm* wide) covered with straight, thick hairs.

In these three instances the iris defect showed itself, as usual, in the left eye.

The first and second cases are of especial interest on account of their direction. Upward colobomata are extremely rare; indeed, with the exception of a passing mention made of one by Ammon, there is in all literature but one other known to me.[1]

The second and third cases also invite our attention to the causation of iris colobomata.

Although Ammon's masterly exposition of the origin of the common (downwards) form is a clear and explicit one, and we know that it is always connected with the fœtal fissure, many theories seek to explain their occurrence in other situations.

Pflüger has expressed[2] the otherwise unsupported opinion that during fœtal life the eye had been rotated 45° outwards, and so remaining has given rise to the outward coloboma. By going a step farther, and supposing an axial excursion of 180°, one might account for even the upward coloboma. This hypothesis will not, however, explain the existence of two colobomata in the same eye, nor of a horizontal iris coloboma, and at right angles to it in the same eye a defect in the choroid.

Makrocki[3] makes an abnormally placed choroidal fissure responsible for these colobomata, nor does Ammon in his work deny the possibility of this. He states that in addition to the physiological fissure which occurs in every eye, a second defect may be present in any situation which remaining open after the closure of the former will give rise to an atypical coloboma.

Abnormalities in the absorption of the pupillary mem-

[1] *Ophthalmic Review*, 1888, p. 310.
[2] These ARCHIVES, xiv., p. 91.
[3] *Archiv für Augenheilkunde*, 1885, p. 73.

brane may, according to Plange,[1] have something to do with the origin of colobomata, but no general rule can be laid down on this point, since, as Bock[2] observes, the two conditions very rarely co-exist.

Lately the occurrence of intra-uterine inflammation is emphasized as an important etiological factor.

Deutschmann[3] was the first to describe the case of a rabbit's eye affected by a downward coloboma of both iris and choroid. The entire region of the defect was the seat of an active sclero-retino-choroiditis, which the writer thought had produced the coloboma.

Thalberg[4] describes a similar case, involving the entire thickness of the uveal tract in both eyes.

Da Gama Pinto,[5] who does not altogether favor the idea of an inflammatory origin of the defect, thinks the condition of the sclera may have something to do with it.

Schiess-Gemuseus[6] reports two inward-upward colobomata. In one bulb he found along with the coloboma a corneal haze, a shallow anterior chamber, and a pupil displaced upwards, conditions which the writer attributes to the occurrence of a former intra-uterine inflammation.

After a reference to a short description which Talko[7] gives of a horizontal inward coloboma, enclosing a dense white membrane, we shall consider two more instances.

Haase[8] reports an inward-downward coloboma which was covered with a delicate transparent membrane, continuous with the iris tissue, but which did not stretch across the pupillary area. Under the microscope it was shown to be made up of close, felt-like connective tissue, containing cells and nuclei. Corresponding to this, the thinned sclera was covered by an areolar membrane that was indissolubly joined to both choroid and retina. The conditions affecting the membrane in the colobomatous area are analogous to

[1] *Archiv für Augenheilkunde*, 1890, p. 194.
[2] *Weiner med. Zeitung*, 1888.
[3] *Monatsbl. für Augenheilk.*, 1881.
[4] These ARCHIVES, xiii., p. 253.
[5] *Archiv für Augenheilkunde*, 1888.
[6] *Klin. Monatsbl. für Augenheilkunde*, 1887.
[7] *Monatsbl. für Augenheilk.*, p. 202.
[8] *Archiv für Ophthalmologie*, 1870.

Case 2, where it appears as if a secondary atrophy had followed an inflammatory attack, even so far as in places to have resulted in entire destruction of the iris.

Mittelstädt[1] mentions a horizontal coloboma of the iris, whose floor consisted of bright brownish gray tissue, "such a picture as one often observes after iridectomies where, in consequence of extensive synechiæ, only the superficial layers of the iris are removed by the forceps." In the same eye, also, there was a circular peripheral adhesion of iris and cornea, which the author regards as a result of an old *seclusio pupillæ*, due to an intra-uterine iritis.

Although I do not attempt to explain the inward-upward coloboma in Case 1 by any of the aforementioned hypotheses, I venture to assert that there are many objections to the theory that the atypical defects in the other instances may be due to a fœtal inflammation.

The third case is of interest in another connection.

Van Duyse has attempted in an ingenious monograph[2] to explain the well-known and not uncommon coincidence of dermoid cysts with coloboma of the lid. He describes a case where a band of cuticle stretched from the sclero-corneal junction backwards to the palpebral margin, then ran parallel to the latter, and was finally inserted into the lid near the inner canthus. This membrane formed a wide bridge with free posterior surface between cornea and lid. Under the microscope it showed the structure of a dermoid tumor.

Bruns[3] makes a similar observation. From the centre of each cornea in an almost full-grown fœtus a delicate band of skin could be traced, which after a short course joined, and as a single process became inserted into the amnion. That coming from the right eye, just before reaching the bulb, divided into two branches, one of which was attached to the cornea and the other to the lower lid.

These are known as Simonart's bands, and are regarded by their discoverer as the outcome of intra-uterine processes,

[1] *Archiv für Augenheilk.*, 1880, p. 426.
[2] Bride dermoide oculo-palpébrale et colobome partiel de la paupière, Gand, 1882.
[3] "Handbuch der praktichen Chirurgie."

whereby adhesions take place between the inner surface of the amnion and adjacent parts of the body. In this way a cuticular filament may connect the amnion with the eye, and so mechanically hinder the growth of the lid where it touches the latter, while the accompanying dermoid cyst represents the point at which the amnion is attached to the membrane which, in the fœtal state, covers over the eye.

Case 3 may then be set down as one of these instances.

SYSTEMATIC REPORT ON THE PROGRESS OF OPHTHALMOLOGY DURING THE THIRD QUARTER OF THE YEAR 1890.

By St. BERNHEIMER, Heidelberg; C. HORSTMANN and P. SILEX, Berlin.

WITH THE CO-OPERATION OF

S. M. Burnett, Washington; Dantone, Rome; Hirschmann, Charkow; E. Marckwort, Antwerp; P. v. Mittelstädt, Metz; L. Werner, Dublin; C. H. A. Westhoff, Amsterdam; Schiötz and Ole Bull, Christiania, etc.

Sections I.–V. Reviewed by Dr. St. BERNHEIMER.

I.—GENERAL OPHTHALMOLOGICAL LITERATURE.

TEXT-BOOKS, MONOGRAPHS, TREATISES ON GENERAL, BIBLIOGRAPHICAL, AND HISTORICAL SUBJECTS.

214. Hirschberg, J. Contribution to the history of cataract extraction. *Centralbl. f. Augenhk.*, 1890, p. 198.

215. Kern. Military surgery of the eye. Berlin, 1890, E. S. Mittler & Son.

216. Gordon Norrie (Copenhagen). Georg Heuermann, first German description of cataract extraction (1756), and of Saemisch's operation (1765). Historical notes. *Centralbl. f. Angenhk.*, 1890, p. 261.

217. Utrecht, 1890. Eenondertigste Jaarlysch Verslagvan het Nederlandsch Gasthuis voor hehoeftige en minvermogende Ooglyders gevestigt te Utrecht.

218. Schmidt, E. E. Report on the eye-department of the Marine Hospital, at Sebastopol, for the year 1889. *Med. supplements of the Moeskoi Sborink*, 1890.

219. SCHMIDT, E. E. Observations from the eye-department of the Marine Hospital at Nicolajews. *Ibid.*, Feb., 1890.

220. WIDMARK. Om verkan af de ultravioletta stra, lerna pa ögat. After a lecture at the Berlin Congress, 1890. *Nord. ophth. Tidsskrift.*, vol. iii., No. 2, p. 61.

According to NORRIE (216) George Heuermann was born in 1723, in Oldesloe in Holstein, and died in 1768 in Copenhagen, as professor of surgery. He was the first to practise Daviel's method of extraction in Denmark. In 1765 he described a method of treating the "purulent eye," which closely resembles the one introduced by Saemisch.

In UTRECHT (217) 3,392 new patients were treated, 454 were admitted to the hospital, 367 operations were performed, among them 47 extractions without iridectomy. Snellen says that in infectious ulceration of the cornea tincture of iodine is the most powerful antiseptic. After previous instillation of cocaine the ulcer is brushed with tincture of iodine, and washed off with glycerine. In symblepharon, Snellen transplants a flap with a pedicle from the lid. The pedunculated flap is drawn through an opening, like a buttonhole, and attached with sutures to the inner surface of the lid. WESTHOFF.

SCHMIDT (218) calls attention to the large number of eye patients (as high as 27.8 per cent.) in the navy of the Black Sea. Affections of the conjunctiva are particularly numerous, especially folliculosis and trachoma. The former he considers the lighter forms or early stage of the latter, which supports, therefore, the view of those who maintain that they are one and the same disease. The frequency of trachoma, the existence of which disease debars recruits from admission to the navy, Schmidt explains by assuming that, on account of differences of opinion, some recruits with folliculosis are admitted as being free from trachoma, and thus spread the disease. Trachoma is also introduced from outside. HIRSCHMANN.

(1) In discussing keratitis punctata, SCHMIDT (219) describes two cases in which numerous punctate dots appeared in the tissue of the cornea, in general syphilis, without implication of the uveal tract. In the second case, pannus trachomatosus was superadded. (2) Report of a case of intraocular neoplasm. The left eye of the patient, aged thirty, is atrophic; where formerly the cornea was, a piece of iron projects from the interior of the eye, which, however, resists extraction. The eye was said to have been

injured seven years previously, and to have run out. No foreign body was observed at the time. Eight months later a piece of iron began to project from the eye without causing pain, but could not be extracted, and did not annoy the patient. Only lately severe pain began to be felt in this eye. After enucleation it was found that the posterior end of the piece of iron, which was 22 *mm* long, was enclosed in a long tumor 7 *mm* thick, round, the size of a pea, firmly attached to the papilla, and composed in its greater part of true bone, with bone corpuscles, and, in its anterior part, of connective tissue, with particles of bone scattered through it. From the choroid the bony tumor is separated by connective tissue. There is no trace of the retina. Schmidt thinks that this bony neoplasm sprang from the retina, and ascribes its formation to the irritation produced by the foreign body. HIRSCHMANN.

WIDMARK (220) gives a brief account of his experiments, showing the effect of the ultraviolet rays upon the anterior media of the rabbit's eye. He also reports that in three of the twelve experiments he found an opacity of the lens ; this seems to him of importance in explaining some cases of cataract from a stroke of lightning, lightning being very rich in ultraviolet rays.

SCHIÖTZ.

II.—GENERAL PATHOLOGY, DIAGNOSIS, AND THERAPEUTICS.

221. CHAUVEL. Un cas de malformation congénitale des deux yeux. *Rec. d'opht.*, 1890, p. 395.

CHAUVEL (221) describes an unusual arrest of development of both eyes. They were of almost normal size and very sensitive to light. T. somewhat diminished. There was horizontal and vertical nystagmus. The corneas were of an elliptical shape The point of the ellipse was directed downward, and here there was an opacity in the cornea. Exactly behind this point the pupil was situated, which in one eye had a diameter of $\frac{1}{2}$ *mm*, in the other 1 *mm*. There was also an opacity at the posterior pole of the lens. Atrophy of the choroid around the papilla with coloboma. R V = L $\frac{1}{200}$. MARCKWORT.

III.—INSTRUMENTS AND REMEDIES.

222. BEDOIN. De l'emploi des pulvérisations dans le traitement des ophthalmiés. *Bull. de thérap.*, 1890, p. 502.

223. BLANC. Notes d'impressions sur l'ocalistique Américaine. *La clinique*, 1890, p. 401.

224. COHN, HERMANN. The photographic rhombohedron camera especially for taking reflected images. *Centralbl. f. Avgenhk.*, 1890, p. 205.

225. COQUE. Note sur le décentrage des verres de lunettes. *Rev. génér d'opht.*, 1890, No. 6, p. 251.

226. DARIER. Appareil destinié a remplacer la boite des verres. *Ann. d'ocul.*, vol. civ., p. 39.

227. FISCHER, E. A. Modification of Bowman's probe. *Centralbl. f. Augenhk.*, 1890, p. 203.

228. GALLERMAERTS. De l'emploi de la pyoktanine dans la clinique du Dr. Coppez. *Ann. d'ocul.*, vol. civ., p. 55.

229. GUAITA. La pioctanine. Note cliniche. *Ann. di ottalm.*, vol. xix., 2, p. 185.

230. JACKSON, E. A unit of strength and system for numbering prisms. *Ophth. Rev.*, vol. ix., p. 169.

231. JAIS L. Sur les effets produits par l'excentration des verres de lunettes sphériques. Tables. *Arch. d'opht.*, vol. x., No. 5, p. 441.

232. KUBLY, F. Aniline colors in eye diseases. *Wjestnik Ophth.*, 1890, Nos. 4 and 5.

233. LAINATI E DENTI. Sull' impiego dei colori di anilina quali antisettici in oculistica. *Gazz. d'oppit.*, 1890, No. 45.

234. NOGNÈS. De la valeur antiseptique des couleurs d'aniline et de leur emploi en ophtalmologie. *Rec. d'opht.*, August, 1890, p. 438, and *La méd. moderne*, 1890, No. 35, p. 665.

235. NOVELLI. L'olio di anilina in terapia oculare. *Bull. d'ocul.*, vol. xii., p. 15.

236. PEDRAZZOLI. I colori di anilina come antisettici ; loro impiego nella pratica, per il Prof. Stilling. Considerazioni e traduz. *Ann. d'ottalm.*, vol. xix., No. 2, p. 123.

237. STILLING. Les couleurs d'aniline comme antiseptique. *Rev. gén. d'opht.*, 1890, No. 4, p. 145.

238. STILLING. Sur l'emploi des couleurs d'aniline. *Rev. gén. d'opht.*, 1890, No. 6, p. 241.

239. STILLING, J. Aniline colors as antiseptics and their application in practice. Second communication. Strassburg, Trübner, 1890.

240. TSCHERNING. Une nouvelle méthode pour mesurer les

rayons de courbure du cristallin. *Soc. franç. d'opht.*, May, 1890. (Tscherning has constructed an instrument for measuring the curvature of the lens, and gives a description of it).

241. VALUDE et AIGNAL. De la valeur antiseptique des couleurs d'aniline. *Arch. d'opht.*, 1890, vol. x., 5, p. 435.

BLANC (223) travelled through the United States for the purpose of study, and praises the instruments used by the oculists of that country. The iris forceps especially he found much smaller and lighter. He also describes at length the squeezing out of the trachoma granules with a forceps constructed for that purpose by Noyes. The operation is done in narcosis, and must be repeated two or three times. MARCKWORT.

COQUE (225) has calculated the prismatic effect obtained by decentring spherical glasses. In biconvex and biconcave glasses the prismatic effect is equal to the decentration (in centimetres) multiplied by the number of the glass (in dioptries) and the number 1.114. In planoconvex and planoconcave glasses the number 0.557 must be substituted for 1.114. MARCKWORT.

DARIER (226) has constructed an apparatus intended to replace the test-case. It consists of two wooden frames which slide upon each other, the one containing 6, the other 7 glasses. The one frame contains: 0, + 1, + 2, + 3, — 3, — 2, — 1, the other, + 0.5, + 7, + 14, — 21, — 14, — 7. The combinations possible are easily found. MARCKWORT.

FISCHER (227) proposes the introduction of caustics simultaneously with Bowman's probes into the lachrymal canal, a plan tried in 1824 by Reisinger with Scarpa's nail. He caused longitudinal furrows to be made, thereby hoping to increase the effectiveness of the probe. Such a furrow can easily be made at the lateral side. It is filled with an astringent or antiseptic substance in form of a powder, and the probe is then introduced. The powder gradually dissolves in the liquid of the lachrymal canal and acts more thoroughly upon the mucous membrane than substances introduced by syringing. The optician Maag, in Dortmund, has such probes in stock.

GALLEMAERTS (228) publishes a number of cases in which pyoktanin was used, in some with good, in others with bad results. Gallemaerts himself says that his observations are not sufficient to permit judgment to be passed on the merits of pyoktanin. Nuel says the same (*Ann. d'ocul.*, vol. civ., p. 58) as to his experiments with the drug. Nuel failed to obtain any improve-

ment in sympathetic disease, but saw good results in conj. blennorrhoica with ulceration of the cornea in an adult.

MARCKWORT.

GUAITA (229), who has used solutions of pyoktanin and the pencils in trachoma, blennorrhœa, hypopyon-keratitis, panophthalmitis and purulent dacyocystitis, speaks unfavorably of the new remedy. DANTONE.

JACKSON (230) reviews the advantages and disadvantages of the various methods proposed for numbering prisms. While all agree that the number of a prism should bear some simple constant relation to its refractive power, the unit of strength and the position of the prism in which the refractive power should be estimated are still *sub judice*. The position of minimum deviation is most easily determined, while the position of refraction all at one surface simplifies calculation. For the unit of strength, the degree has the advantage of being the unit of angular measurement in general use, but it would necessitate a complete change in the present system, and create a need for fractional numbers.

WERNER.

JAIS (231) has prepared three tables, showing in tenths of millimetres the decentration of the glass necessary for every degree of ametropia and insufficiency of the internal recti muscles. The tables are calculated for base-lines of 50, 64, and 75 *mm.*

V. MITTELSTÄDT.

KUBLY (232) tried the yellow and violet pyoktanin (Merck's) in solutions of 1:2,000, 1:1,000, 1:500, and, in a few cases, 1:100; also the pencils, in 500 patients on the lids, in eczema, hordeolum, abscess, blepharitis ciliaris, herpes, injuries, combustion, in acute and chronic phlyctenular, trachomatous, blennorrhoic, and traumatic conjunctivitis; in trachomatous, phlyctenular, parenchymatous, and traumatic keratitis, in corneal ulcers; in corneal ulcers with hypopyon; in various forms of iritis; in iridochoroiditis after typhoid fever; in sympathetic, disseminate, and areolar iridochoroiditis; finally in blennorrhoic dacryocystitis. The drug was well borne in all cases. In none did he see any benefit follow its use. Pyoktanin acts indifferently in all these affections. HIRSCHMANN.

LAINATI and DENTI (233), who tried the blue pyoktanin, are not yet prepared to give a definite opinion as to the effect of the remedy, but only say that it is well borne and harmless. In some undoubtedly infectious diseases it failed to act; in others it did

not surpass in any way the antiseptics now in use in ophthalmology. In only one case they obtained an astonishingly quick result, a purulent dacryocystitis being cured in three days by injections of a 2 per-cent. solution. DANTONE.

NOGNÈS (234) publishes therapeutical experiments with aniline colors, conducted at the clinic of Panas. According to Nognès, the eye will readily bear solutions of 1:2,000 to 1:1,000. The latter causes neither pain nor inflammation. In all purulent affections of the conjunctiva, and in all cases of inflammation of the cornea, these substances seem to act as good antiseptics. In trachoma they seem to be less effective. MARCKWORT.

PEDRAZZOLI (236), who has translated Stilling's publications, has himself frequently used aniline-violet in a solution of 1:1,000, and finds that it is not superior to the remedies now in use in acute conjunctivitis, trachoma, and phlyctenulæ. In chronic conjunctivitis and hypopyon-keratitis it is somewhat more effective; and it is excellent in the later stages of interstitial keratitis, while in the beginning of this disease it is not well borne. He anticipates a great future for the aniline colors. DANTONE.

STILLING (237) has experimented with the aniline colors in regard to their antiseptic action, and highly recommends them for asepsis and antisepsis. Of the different colors, methyl violet was used most frequently. His experiments were: 1, botanical and bacteriological; 2, on animals; and 3, therapeutic, on human beings. Methyl violet in a solution of 1:30,000 is said to arrest the development of the bacteria of suppuration. Stilling claims to have obtained very good therapeutic results in corneal ulcers, in hypopyon-keratitis, and even in parenchymatous keratitis, in serous iritis, disseminate choroiditis, and sympathetic ophthalmia. He also claims good results in general surgery. In many cases he saw the pupil dilate in human beings after instillations of methyl violet, without limitation of the accommodation.

MARCKWORT.

In a second paper, STILLING (238) discusses the method of using the aniline colors as antiseptics. He uses them—1, in substance; 2, in form of a larger or smaller pencil; 3, as a powder (1:1,000 to 1:50); 4, as a salve (1:50 to 1:10, in blepharitis ciliaris, eczema, etc.), and in solution (1:1,000 to 1:100).

MARCKWORT.

STILLING'S (239) second communication on aniline colors is divided into a botanical part, prepared by Dr. Wortmann, and a

physiologico-medical part. He claims that they possess to a high degree the power of checking the development and also of killing the bacteria and their spores. As to the manner of this action, the bacteria seem to agree in all essential points with the cells of the higher plants examined by Pfeiffer in this direction. Methyl violet also checks the development of the spores of mould, completely preventing their sprouting. He claims the following physiological advantages for pyoktanin: 1, its perfect harmlessness, so that it does not matter whether weak or strong concentrations or the pure substance is used; 2, pyoktanin does not coagulate albumen, which cannot be said of any other known antiseptic; 3, its power of diffusion is extremely great. If, notwithstanding these properties, it should be impossible to obtain any practical results with it, this can lie alone in the fact that the remedy cannot always be brought to the spot where the pathogenic micro-organisms are found. (For a detailed report, see the original.)

VALUDE and VIGNAL (241) conclude from a series of experiments on the action of violet and yellow pyoktanin on streptococcus pyog. and staphylococcus aur., and upon a mixture of bacteria in bouillon, that these substances are very weak antiseptics. Two kinds of methyl violet and one auranine were about equally efficient. Pyoktanin in a solution of 1:5,000 had no effect whatever in ordinary catarrhs of the conjunctiva and in blennorrhœa. In a case of serpent corneal ulcer, which would not heal under any other treatment, there was a surprisingly quick improvement after pyoktanin. A valuable quality of the aniline colors, however, is the ease with which they penetrate into the tissues. They may prove useful in infectious corneal ulcers, when applied in concentrated form. v. WITTELSTADT.

IV.—ANATOMY.

242. BIELONSOFF, ALEXEY. Nervi vasorum. Diss. with twenty-two colored plates (Russian). *Rev.* in *Klin. Monatsbl. f. A.*, vol. xxviii., p. 334.

243. BOUCHERON. Nerfs de l'hémisphère antérieur de l'œil. Nerfs ciliaires superficiels. Nerfs ciliaires externes. Nerfs tendino-scléroticaux. Nerfs cornéens et conjonctivaux. Nerfs de l'espace pectiné. Compt. rend. de la soc. de biol., Paris, 1890. Masson.

244. CIRINCIONE. Sulla struttura delle vie lagrimali dell' uomo. *Riforma med.*, vol. vi., 1890.

245. DELBRÜCK, ANTON. Contribution to the knowledge of the decussation of the nerve fibres in the chiasma. *Arch. f. Psych. u. Nervenkrankh.*, vol. xxi., p. 747.

246. NUEL, J. C., and CORNIL, F. De l'endothélium de la chambre anterieure de l'œil, particulièrement celui de la cornée. *Arch. d'opht.*, vol. x., 5, p. 309.

BOUCHERON (242) observed that after complete optico-ciliary neurotomy, the cornea does not become completely insensible. He explains this by saying that only the centre of the cornea is supplied by the deep ciliary nerves, while the periphery is supplied by "superficial or anterior ciliary nerves," which cannot be cut in this operation. These superficial ciliary nerves come from, (1) the orbital nerve at the base of the orbit, (2) the sensory nerves of the muscles, (3) the sensory intraorbital nerves, (4) the nerves of the "espace pectiné," and (5) they form anastomoses with the deep ciliary nerves. MARCKWORT.

On the basis of careful histological examinations of the structure of the lachrymal passages, CIRINCIONE (244) describes the following tissues, which he claims have thus far not been recorded in literature: (1) in the caruncle a small acinous gland, the duct of which lies at the apex between two large sebaceous glands; (2) in the conjunctiva beside the caruncle small tubular glands, formed by indentation of the conjunctiva and its epithelium; (3) in the lachrymal canals, groups of acinous glands, which, however, are not constantly found; (4) in the lachrymal sac mucous glands, tubular and two kinds of acinous glands; (5) lymph-nodules in the upper part of the nasolachrymal canal, as found elsewhere in the human body. DANTONE.

DELBRÜCK (245) had the opportunity to examine the chiasma of a person, aged 70, suffering from dementia, in which complete degeneration of the left, and partial of the right, optic nerve was accidentally found at the autopsy. No ophthalmoscopic examination was made. "The patient could at least find his way without difficulty." The optic nerves and chiasma were divided into cross and frontal sections, and stained, according to Weigert. The author decidedly believes in the partial decussation in the chiasma. He also thinks that he can "safely assert the following: The uncrossed fibres are united in the nerve in thick bundles, which run in a solid mass mainly on the lateral side of the nerve.

In the chiasma, however, and, still more, in the tractus, they gradually mix more and more with the crossed fibres, yet do not spread over the whole cross section of the tractus, but leave free at first the lower inner quadrant, and later a gradually narrowing zone at the whole lower edge of the tractus." It may also be supposed that the uncrossed fascicle lying on the lateral side of the nerve divides in two in the region of the entrance of the arteria centralis retinæ, maintaining the lateral position in a general way, but separating a little upwards and downwards, and thus reaching the globe.

NUEL and CORNIL (246) describe in detail the structure of the endothelium of the anterior chamber. The pigeon and siskin are best adapted for these investigations. But also in mammals and in man the structure of the endothelium is the same in general. In order to preserve the normal conditions of the very delicate endothelium, a solution of osmium was injected into the anterior chamber immediately after the death of the animal and the escape of the aqueous humor, and the enucleated eyeball was placed in the same solution. The protoplasm of the hexagonal endothelial cells consists of very fine fibres, united in bundles and forming with those of the neighboring cells a delicate network. At the point of intersection the nuclei lie, the anterior and posterior surface of which is also covered with the network. They show a special relation to a structureless membrane in contact with the aqueous in the living, to which they adhere when the latter is removed. Numerous illustrations aid in setting forth the details, which cannot be entered into without the former. The authors then describe the cadaveric changes of the endothelium, also those following injury, injection of water, and electrical irritation. Practically it is worthy of note that only a 4 per-cent. solution of boric acid and a weak one of chloride of sodium do not attack the endothelium, while solutions of mercurial salts, on the other hand, destroy all the cells. The regeneration takes place from the iris angle. On the endothelium of the anterior surface of the iris, the structure of which has not yet been sufficiently studied, the authors found in the rabbit numerous stomata, but almost exclusively near the pupillary margin and the ciliary part, very much like the issues and openings described by Fuchs on the anterior surface of the human iris, to which they correspond.

v. MITTLESTÄDT.

V.—PHYSIOLOGY.

247. ARCOLEO. Osservazioni esperimentali sugli elementi contrattili della retina negli animali a sangue freddo. *Ann. di ottalm.*, vol. xix., 3 and 4, p. 251.

248. AUBERT. The inner language and its relations to the perceptions of the senses and to the movements. *Zeitschr. f. Psychol. u. Physiol. der Sinnesorgane*, vol. i., p. 53.

249. AUBEBT. The binocular perimicroscope. *Arch. f. d. ges. Physiol.*, vol. xlvii.

250. BASEVI, VITTORIO. Fisiologia dei centri innervatori dell' iride. *Ann. di ottalm.*, vol. xix., 2, p. 144.

251. BASEVI, VITTORIO. De la vision stéréoscopique dans ses rapports avec l'accommodation et les couleurs. *Ann. d'ocul.*, vol. ciii., p. 222.

252. CHARPENTIER. Recherches sur la persistance des impressions rétiniennes et sur les excitations lumineuses de courte durée (suite). *Arch. d'opht.*, vol. x., No. 4, p. 340.

253. EXNER, SIG. The disappearance of the after-images in movements of the eyes. *Zeitschr. f. Psych. u. Physiol. d. Sinnesorgane*, vol. i., 1, p. 47.

254. GREEN, J. L. On colour blindness. *Brit. Med. Jour.*, 1890, p. 234.

255. HELMHOLTZ, H. The disturbance in the perception of the smallest differences of illumination by the proper light of the retina. *Ibid.*, p. 5.

256. HERING, E. A contribution to the knowledge of simultaneous contrast. *Ibid.*, p. 18.

257. IMBERT. De l'état de l'accommodation de l'œil pendant les observations au microscope. Paris, 1889.

258. LIPPS, TH. On a false projection of the after-images. *Ibid.*, p. 60.

259. NICATI. Notes pratiques. Manière de déterminer plus précisement la position de l'image ophtalmoscopique renversée, en mesurant le degré de la myopie.

260. QUERENGHI. Contributo clinico alla fisiologia del ganglio ottalmico. *Ann. di ottalm.*, vol. xix., 2, p. 113.

261. QUERENGHI. Altro caso clinico a contributo della fisiologia del ganglio ottalmico. *Ann. di ottalm.*, vol. xix., 3 and 4, p. 265.

ARCOLEO's (247) experiments on frogs and toads on the influence of the nerve-centre on the contractile elements of the retina have shown that after removal of the brain the reaction of the retinal epithelium and the outer portions of the rods and cones to light, electricity, pressure, and heat goes on the same as before the removal of the brain. Other experiments upon the same animals as to the trophic action of the optic nerve upon the retina showed that division of the nerve has no effect upon nutrition, but that division of the ciliary nerves in a short time causes the most diverse disturbances in the choroid and in all the layers of the retina. DANTONE.

According to BASEVI (250) who made numerous experiments on dogs, cats, rabbits, and especially on pigeons, to determine the seat of the centres governing the movements of the iris, the centre for the sphincter lies in the posterior wall of the third ventricle in front of the corpora quadrigemina and in the medulla oblongata; a secondary centre lies in the ciliary ganglion. The centre governing the dilatation of the pupil is found between the lower part of the last cervical vertebra and the first two dorsal vertebræ, and at the posterior part of the anterior pair of the corpora quadrigemina and at the posterior pair; a second centre lies in Gasser's ganglion. The author found no difference between mammals and birds in regard to these centres. DANTONE.

BASEVI (251) made the peculiar observation that when different colors placed upon the same black background, and therefore in the same plane, are observed, they seem to be at different distances. At a distance of 5 metres yellow seemed to be about 1.5 *cm* and red about 0.9 *cm* nearer than blue. On a colored background these apparent differences changed, but also in accordance with strict laws. Basevi's observations are worthy of the attention of painters for the production of perspective effects. MARCKWORT.

EXNER (253) opposes the explanation of Fick, that the disappearance of the after-images on movements of the eyes is due to the recovery of the retina produced by muscular action, and adheres to his previously expressed opinion, according to which the disappearance of the after-images on movements of the eyes must be accepted as a special case of the general rule, according to which all subjective phenomena disappear on movements of the eyes.

GREEN (254) mentions a case of yellow-blindness, caused by observation of the sun through a telescope, the dark glass having

been displaced for a moment. (No examination with the ophthalmoscope.) WERNER.

According to IMBERT (257) accommodation is scarcely at all called into play in using the microscope, from which he draws the unjustifiable conclusion that the eyes are not more strained thereby than ordinarily. MARCKWORT.

Instead of determining the shortest distance at which the inverted image is still clearly recognized in estimating myopia, NICATI (259) approaches the eye under examination until the inverted image completely disappears and the pupil appears of an even red. The examining eye is then at the focus of the eye examined, and the distance between the two gives the degree of myopia. v. MITTELSTÄDT.

In a young man, in whom a retrobulbar hemorrhage had probably taken place after an injury, QUERENGHI (260) observed amblyopia of the eye in question (discoloration of the papilla), mydriasis, which did not yield even to the strongest light, complete paresis of the accommodation and diminished sensibility of the cornea. The tactile sense of the cornea and the reflex contraction of the pupil on convergence and illumination of the healthy eye remained. The author therefore thinks that as there were no other symptoms of paralysis, the hemorrhage had mainly affected the optic nerve and the ciliary ganglion, and that the following conclusions may be drawn in regard to the physiology of the latter; the accommodation, the pupillary reflex upon illumination of the same eye and the sensibility of the cornea to pain are dependent upon the ciliary ganglion, while the reflex pupillary movement on convergence and on the action of light upon the other eye and the tactile sense of the cornea are directly transmitted from the central organs, with exclusion of the ciliary ganglion and probably through the long ciliary nerves.

DANTONE.

QUERENGHI (161) finds the conclusions just stated confirmed by a second clinical case. The injury was a much more extensive one, and the hemorrhage into the orbit had also caused a weakness of the optic nerve, but the ciliary ganglion had suffered less than in the first case: there was no hyperæsthesia of the cornea, the accommodation and pupillary reaction were decidedly diminished but not abolished, while the reflex movements on convergence and illumination of the healthy eye were the same as in the first case. DANTONE.

Sections VI.–XI. Reviewed by PROF. HORSTMANN.

VI.—ANOMALIES OF REFRACTION AND ACCOMMODATION.

262. BULL. Remarques sur l'examen ophtalmométrique et optométrique d'un certain nombre d'yeux astigmates. *Soc. franç. d'opht.*, May 8, 1891.

263. CHIBRET. Astigmatisme selon et contre la règle. *Arch. d'opht.*, vol. x., 4, p. 357.

264. GIFFORD, H. The needless prescription of spectacles. *N. Y. Med. Record*, July 5, 1890.

265. GULLSTRAND, A. Bidrag til Astigmatismens Teori. *Nord. med. Arkir*, vol. xxii., 2.

266. GULLSTRAND, A. An brännlinier rid Astigmatism. *Nord. ophth. Tidsskr.*, vol. iii., 1, p. 1.

267. HOTZ, F. C. A simple and reliable astigmometer. *Jour. Amer. Med. Asso.*, Sept. 20, 1890.

268. MARTIN, G. Amblyopie astigmatique. *Ann. d'ocul.*, vol. ciii., p. 229. *Soc. franç. d'opht.*, May 8, 1890.

269. NULL. Une curiosité de l'œil myope. *Ann. d'ocul.*, vol. civ., p. 43.

270. SMITH, PRIESTLEY. The causes, prevention, and treatment of myopia. *Ophth. Rev.*, vol. ix., p. 254.

271. STILLING, J. The growth of the orbit and its relation to refraction. *Arch. f. Augenhk.*, vol. xxii., p. 47.

272. TSCHERNING, M. De l'influence de l'aberration de sphéricité sur la refraction de l'œil. *Arch. d'opht.*, vol. ix., 5, p. 445.

BULL (262) discusses the difference in the results of the subjective examination and the ophthalmometric determination, and explains it partly by the rotation of the lens about its vertical axis assumed by Tscherning. According to Bull the hypothesis of an astigmatic spasm of accommodation is not justified.

MARCKWORT.

CHIBRET (263) finds a greater number of astigmatic patients since he has used sciascopy. Among 569 patients 6.5 per cent. were astigmatic, 5.2 per-cent. being according to rule, and 1.3 per-cent. against it. The latter form was *not* discovered with the ophthalmometer, but only by sciascopy combined with the subjective test. In using the former the astigmatism is not measured

in the line of vision but 1 *mm* to the temporal side of it, thereby appearing less or being absent entirely. The subjective test may, however, agree with the result found with the ophthalmometer, as a part of the As. can be corrected by astigmatic accommodation. This part sometimes reaches 2 D. Sciascopy alone can determine in such cases the total degree of astigmatism. As. against the rule occurs in about one fifth of the whole number of cases, is frequently not attended by any As. discoverable with the ophthalmometer, and can only be determined by sciascopy. It sometimes reaches 2 D. The correction found subjectively lies between that obtained with the ophthalmometer and that found by sciascopy, and approaches the former in As. according to the rule, and the latter in As. against the rule. In practising sciascopy, after neutralizing any ametropia the examiner may possess, he advises the determination and correction of the refraction of one meridian, and then to compare, at a distance of 80 *cm*, not the *movements* of the shadows, but the *differences in their brightness.* He claims that a difference of 0.25 D can easily be recognized and that the accuracy of this test is far superior to that of the examination in the erect image. V. MITTELSTÄDT.

GIFFORD (264) protests against the routine prescription of spectacles for low forms of ametropia, particularly in children.

BURNETT.

In developing the theory of astigmatism GULLSTRAND (265, 266) has admitted into the equations of a pencil of light the infinitely small quantities of another degree, and without using the approximation of Matthiesen or the theory of Sturm he has arrived at results materially differing from those thus far accepted. They could be verified by experiments and applied to pencils of light of finite size. He found that the ordinary astigmatic pencil of light need not have any focal line whatever.

There are certainly two thinnest cross-sections at both focal points, so that when for instance the principal meridians are horizontal and vertical, the pencil of light is thinnest at the one focal point in a transverse, at the other in a vertical direction; the cross-sections, however, are generally not linear, but of a certain width, which can be calculated for a given pencil of rays; in a general way they are neither perpendicular to the principal ray of the pencil, on the contrary they may form with it any kind of an angle. Three forms may be set up. The first form has two straight focal lines, which at the two focal points are per-

dicular to the principal ray. The second form has a straight focal line, which usually forms an acute angle with the principal ray. This is the most important form, which occurs in the human eye, as he has also shown by experiments. The third general form for the astigmatic pencil of light has no straight focal line, and need not have any focal line at all.

SCHIÖTZ.

HOTZ'S (267) apparatus is but a modification of Donder's round point of light. He has three points of light close together and arranged so that they can be rotated on a disc. When the three are elongated and point in the same direction, that marks one of the astigmatic meridians. It is very similar to Purvis' apparatus devised some years ago. BURNETT.

MARTIN (268) endeavors to explain those cases of astigmatism, in which perfect correction cannot be obtained, by assuming an astigmatic amblyopia, which he thinks develops when the retina from earliest childhood receives only blurred images of lines of a certain direction. Martin says: "When the correction (by astigmatic accommodation) is insufficient, the image is diffuse in one direction, and in this direction a persistent amblyopia appears, which I propose to call astigmatic, in order to designate its manner of development." Armaignac, Leroy, and Javal express themselves rather doubtfully in regard to Martin's explanation. MARCKWORT.

In his latest publication MARTIN tries to disprove the objections raised by Leroy and Armaignac at the *Soc. franç. d'opht.* (May, 1890), and endeavors to show that astigmatism may actually cause amblyopia; as the images formed upon the retina are indistinct in one axis on account of the astigmatism, the retina becomes less sensitive in this axis, therefore amblyopic, as in cases of congenital cataract which have not been operated upon at an early age. In subjectively determining the best correcting-glass Martin chooses that one with which those three lines are best seen upon the large plate of Snellen bearing the triplicate radii, which previously appeared the most indistinct. Sometimes even with the best correction all the lines are not equally black.

MARCKWORT.

NUEL (269) endeavors to prove that the judgment, which we form after retinal irritation as to the direction and distance of the objects seen, may change when the position of the retina changes. According to Nuel the retina is displaced so much in

increasing myopia and staphyloma that retinal lines formerly vertical become inclined. If judgment did not also change, such myopes would see vertical objects inclined and vice-versa.

MARCKWORT.

PRIESTLEY SMITH (270) objects to the view that myopia is the result of redundant growth and indication of a higher state of intellectual development, and considers that it is mainly an expression of a weakness of the tunics. When the condition is stationary he would give the same glasses for reading and distance.

WERNER.

STILLING (271) thinks that the higher the percentage of myopes, the lower the average index of the orbit, the more myopes there are, the more the average indices of myopes and emmetropes will increase, and the lower will be the average index of the latter; the more emmetropes there are, however, the higher the average index will be. The difference in the indices of emmetropia and myopia will be the greater, the larger the number of emmetropes, and the higher the average index for emmetropia will be.

TSCHERNING (272) finds in the spherical aberration of the cornea the cause why, in the higher degrees of As., the ophthalmometer marks it too low, because the refraction considerably increases towards the periphery in the meridian of greatest curvature, much more than in the meridian of least curvature. The ophthalmometer does not measure the radius of curvature at the apex of the cornea, but that of a circle 1 *mm* distant from it; this radius is larger. The As. of the cornea can be corrected and even over-corrected by the spherical aberration of the lens, but this cannot neutralize the increase of As. of the cornea towards the periphery without the lens itself being astigmatic. The spherical aberration of the lens explains without the aid of other theories the increase or decrease of refraction observed after atropine, also the increase of astigmatism. From this the practical conclusion can be drawn that too great a value should not be attached to the measurements found in mydriasis, and that a spherical or astigmatic spasm of accommodation should never be assumed in a case of decrease of refraction during mydriasis, or that there is astigmatism without a test with a diaphragm. In conclusion he advises, in opposition to Chibret, not to attach absolute confidence to the results of an objective examination. The subjective test must always be the one which finally guides us.

v. MITTELSTÄDT.

VII.—LIDS.

273. GILLET DE GRANDMONT. Greffe de peau de grenouille appliquée à la restauration des paupières. *Soc. franç d'opht.*, July, 1890.

274. POOLEY, T. R. Operation for ectropion of the lower lid by the sliding-flap method. *Amer. Four. Ophth.*, Sept., 1890.

275. RUMSCHEWITSCH, K. The onkology of the lids. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxviii., p. 387.

GILLET DE GRANDMONT (273) showed at the Paris Ophthalmological Society a girl, aged thirteen, in whom he had used the skin of a frog's belly for a blepharoplasty of both lids of the right eye. After detaching the edges of the lids from the orbital margin, to which they had become adherent by scars, and after performing the blepharoraphy, he covered the two raw surfaces, after previously drying them, with small pieces of skin (3 to 4 sq. *mm*) from the skin of a frog's belly. The result was very good. After Despagnet and Valude had remarked in the discussion that the same results could be obtained with pedunculated flaps from the neighborhood, Darier said that, if that were the case, the transplantation of the skin of an animal was to be preferred.

MARCKWORT.

POOLEY (274) was entirely successful in relieving an ectropion of the lower lid, the result of an operation for removal of a malignant growth by means of a sliding flap drawn from the temple and cheek. There was no suppuration of the flap whatever, and the resulting deformity is very slight. BURNETT.

RUMSCHEWITSCH (275) describes a case of lymphangioma, and one of epithelioma of the lids. He also gives the results of the examination of a granuloma of the lid, an adenoma of Krause's glands, the sebaceous glands and the modified sudorific glands of the edge of the lid, a dermoid of the lower lid, a papilloma of the edge, and an adenoma of Meibom's glands.

VIII.—LACHRYMAL APPARATUS.

276. CIRINCIONE. Tracoma dei canaliculi lacrimali. *Giorn. dell' assoc. dei naturalissi e medici*, vol. i., 4.

277. DUFOUR. Oreillons des glandes lacrymales. *Rev. méd. de Suisse Romande*, 1890, p. 490.

278. NORRIE, GORDON. Parotitis epidemica begyndt i faarekirflerne. *Nord. ophth. Tidsskr.*, vol. iii., 1, p. 30.

279. SGROSSO. Contributo alla dacrioadenite acuta. *Ann. di ottalm.*, vol. xix., 2, p. 159.

CIRINCIONE (276) had the opportunity to examine the eyes after death of three persons affected with trachoma, and found that the canaliculi also took part in the trachomatous process, their walls showing the same changes as the conjunctiva.

In a fourth corpse the whole mucous membrane of the lachrymal sac was covered with trachoma-granules, which were also found numerously in the canaliculi, but only in small numbers in the fornix ; the development had therefore begun in the lachrymal sac. The author mentions that thus far in only one case, described by de Vincentiis, trachoma was demonstrated in the lachrymal conducting apparatus with the microscope.

DANTONE.

A girl aged eleven presented herself to GORDON NORRIE (278) with slight catarrhal conjunctivitis, and the outer part of the upper lids was slightly swollen. The following day the swelling of the lids was more marked, but mainly confined to the region of the lachrymal glands. The next day mumps. The lachrymal and parotid glands were of the same consistence.

SCHIÖTZ.

SGROSSO (279) reports on two tumors at the outer canthus, which were incised and proved to be genuine abscesses of the lachrymal gland. DANTONE.

IX.—MUSCLES AND NERVES.

280. BROWNE, E. A note on the conjugate movements of squinting eyes. *Ophth. Rev.*, vol. x., p. 222.

281. CASPER. Combined paresis of the ocular muscles by direct injury. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxviii., p. 451.

282. DARKEWITSCH, L. O. Recurrent paralysis of the oculomotor nerve. Moscow, Sept., 1890. Reprint.

283. EISSEN, W. Three cases of functional disturbances of the movements of the eyes. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxviii., p. 427.

284. FUCHS. A rare case of paralysis of the facial and abducent nerves. *Wiener klin. Wochenschr.*, 1890, No. 9.

285. MOCOSOW, L. A case of functional torticollis due to congenital concomitant squint. *Wratsch*, 1890, No. 33.

286. NORRIE, GORDON. Noyle sjaldene Tilfcelde af Nystagmus. *Nord. ophth. Tidsskr.*, vol. iii., 1, p. 24.

287. REICH. Co-ordinate spasm of the superior recti muscles. *Wjestnik Ophth.*, 1890, Nos. 4 and 5.

288. SCHNELLER. Contributions to the theory of squint. *von Graefe's Arch. f. Ophth.*, vol. xxxiv., 3, p. 138.

289. TAYLOR, S. T. Miner's mystagmus and the safety lamp. *Brit. Med. Jour.*, Aug., 1890, p. 480.

290. VALUDE. Le strabisme névropathique. Étude de pathogénie. *Arch. d'opht.*, vol. x., 4, p. 326.

291. VIALET, N. De la cure du strabisme dans ses rapports avec l'acuité visuelle de l'œil devié. *Arch. a'opht.*, vol. x., 4, p. 289.

BROWNE (280) states that in cases of convergent strabismus the centre for conjugate movements acts as in normal eyes, but that when once the limit of internal movement has been reached by one eye, the external rectus of the fellow-eye is able to exert an independent and supplementary action. WERNER.

After a blow in the region of the left inner canthus CASPAR (281) saw paresis of the left internal rectus and of the trochlearis, which healed under local faradization.

DARKEWITSCH (282) furnishes an analysis of relapsing paralysis of the oculomotor nerve on the basis of a case observed by himself and twenty collected from the literature of the subject. The constant symptoms are: uniocular ptosis, deviation of the eye outward, checked mobility inward, upward, and downward, mydriasis, and paralysis of accommodation, the function of the other eye not being impaired. Inconstant symptoms are: anæsthesia or paræsthesia of the upper branch of the fifth nerve, nausea, vomiting, headache. This combination of symptoms and the recurrence of the affection make the diagnosis certain. When the statements of the patient and the symptoms are not reliable, youthful age, constant headache on one side, nausea, and vomiting, the absence of all other symptoms of paralysis and the short duration of the paralysis are in favor of this diagnosis. The cause may be a chronic affection of the nerve on its way at the base of the brain from meningitis, neoplasm, etc. The relapses are probably due to temporary disturbances of circulation.

The prognosis is doubtful. All methods of treatment have thus far been unsuccessful. (After a review in *Wratsch*, No. 35.)

HIRSCHMANN.

Eissen (283) describes three cases of functional disturbance of the ocular movements in highly nervous persons.

In one the abducent was affected, in the second the oculomotor, and in the third all the external ocular muscles. In all of them there was concentric limitation of the visual field. As the general health improved the ocular affection disappeared. All three cases were probably due to hysteria.

In a girl of fourteen, who in her third year had suffered a fracture of the skull and now showed paralysis of the left facial, the left abducent, paresis of the acoustic and of the motor portion of the fifth nerve, Fuchs (284) observed a gaping of the left palpebral fissure, which remained open even when the attempt was made to close the eye. There was also marked convergence due to the contraction of the internal rectus.

Mocosow (285) saw a case of functional torticollis due to congenital concomitant squint. The patient's head was turned towards the left shoulder and downwards about 35°, and the left side of the face projected a little more than the right. The left eye had V $\frac{10}{10}$, the right $\frac{8}{10}$. Both E. While the head was in the position just described the irregularity of the position of the eyes was scarcely noticeable. When the head was held straight the right eye at once deviated distinctly upwards and outwards.

Hirschmann.

Gordon Norrie (286) reports on seven cases of nystagmus. In two of them an injury was followed by nystagmus in one eye with rotation of the head to one side, both of which symptoms disappeared in a short time. Schiötz.

A drover, thirty years old, otherwise healthy, but somewhat pale and apathetic, presented himself at Reich's (287) policlinic with a spasmodic sursumduction of both eyes, which returned every ten minutes or even more frequently, and lasted about four or five minutes. During the spasm there appeared under the forcibly raised upper lid only the lower edge of the cornea, which appeared with a slow movement, sometimes more, sometimes less. In the intervals no pathological changes could be found in the eyes. The affection had lasted about ten days, and followed a fever of three days' duration. Injury or headache was denied. After the internal exhibition of bromide and iodide of potassium the attacks rapidly decreased. Reich has found in the literature of the subject only one analogous case of intermittent tetanus of the superior recti muscles, namely, that of Samelsohn. Hirschmann.

TAYLOR (289) maintains that insufficient light is quite enough to cause nystagmus without any peculiarity of position, just as a dense corneal leucoma may produce it. The reason "holers" are so liable to it is that, (1) the light is worse where they work; (2) "holing" is more exhausting work than any other in coal mines. WERNER.

After reporting the clinical history of thirty cases VALUDE (290) comes to the conclusion that the ordinary concomitant strabismus does not depend on ametropia alone and that the explanation of Donders perhaps does not even fit the majority of cases, but that a neuropathic disposition is an important, sometimes the principal factor in the development of strabismus. There are cases in which ametropia alone, in others the nervous affection, in still others both combined, are the cause. The treatment, accordingly, must vary, and in not a few cases must be directed against the constitutional affection. Sometimes this treatment alone is sufficient to effect a cure. When these principles are neglected the strabismus, though removed by an operation, may return. By neuropathy the author does not necessarily mean nervous degeneration of epileptic, hysterical or neurasthenical persons. Simple nervousness may be sufficient. It can be transmitted to children and cause strabismus. Hysteria may also cause strabismus without ametropia. The latter is the predisposing, the former the incidental cause.

v. MITTELSTÄDT.

VIALET (291) first presents a review of the various diametrically opposed views as to the relation between the amblyopia of the deviating eye and strabismus. Among 150 cases of strabismus in Landolt's clinic, he found 122 with amblyopia. From these he selected 51, which were frequently examined and carefully tested to decide this question. Of these 51, there was convergent strabismus in 45 and divergent in 6 cases. There was no improvement after the operation in only 8 cases, and increase of visual power is therefore the rule. Improvement was mainly observed in convergent strabismus, brief existence and slight amblyopia. In old and high degrees of amblyopia, which the author considers congenital, improvement is very rare. The author believes in amblyopia from disease, and thinks that after the eye has been straightened, the refractive error corrected and the weak eye stimulated to take part in the visual act, the visual power will improve and binocular vision then becomes possible. v. MITTELSTÄDT.

X.—ORBIT AND NEIGHBORING CAVITIES.

292. EULENBURG, A. On astasia-abasia in Basedow's disease. *Neurol. Centralbl.*, 1890, No. 23.

293. PANAS. Considérations cliniques sur les abscès des sinus frontaux pouvant simuler des lésions indépendantes de la cavité orbitaire. *Soc. franç. d'opht.*, May 8, 1890.

294. SNELL, S. Sinus of left orbit associated with disease of right upper central incisor. *Ophth. Rev.*, vol. ix., p. 193.

In a girl suffering with Basedow's disease, EULENBURG (292) observed astasia and abasia, inability to stand or walk.

In SNELL'S (294) case, that of a girl æt. 17, a sinus formed at the lower margin of the left orbit as a result of disease of the right upper incisor, which had been fractured by a fall. The sinus closed after its removal. WERNER.

XI.—CONJUNCTIVA, CORNEA, SCLERA, ANTERIOR CHAMBER.

295. ALLEMAN, L. A. W. Galvanism in the treatment of corneal opacities. *Brooklyn Med. Jour.*, Nov. and Dec., 1890.

296. BLESSIG, E. Report of a case of subjunctival cysticerci. *Wjestnik Ophth.*, 1890, No. 4, p. 321.

297. BRAUNSCHWEIG, P. Contribution to the knowledge of infantile xerosis of the conjunctiva. *Fortschritte d. Med.*, 1890, No. 23.

298. BURNETT, SWAN M. Racial influence in the etiology of trachoma. *Med. News*, Nov. 22, 1890.

299. KEINIG, H. and O. A method of treating trachoma successfully tried in numerous cases. *Deutsche Med. Wochenschr.*, 1890, No. 41.

300. KOLLOCK, CH. A form of xerosis. *Ophth. Rev.*, vol. ix., p. 249.

301. MAGEE, R. S. Corneal ulcers, with special reference to their treatment by the galvano-cautery. *Kansas Med. Jour.*, Nov., 1890.

302. MÆURER, C., JR. Cauterization of the conjunctiva with mercurial precipitate, and the simultaneous internal exhibition of iodide of potassium. *Arch. f. Augenhk.*, vol. xxii., p. 24.

303. NORRIE, GORDON. Xerosis of the conjunctiva. *Nord. ophth. Tidsskr.*, vol. iii., 1, p. 31.

304. NORRIE, GORDON. Tuberculosis of the conjunctiva. *Nord. ophth. Tidsskr.*, vol. iii., 1, p. 19.

305. RAEHLMANN, E. On trachoma. *Deutsche Med. Wochenschr.*, 1890, No. 41.

306. ROSMINI. Sull' uso del sublimato corrosivo nella terapia oculare e specialmente nella cura dell' ottalmia granulo-tracomatosa. *Boll. d'ocul.*, vol. xii., Nos. 14, 15, 17, 18, 19.

307. SCHAPRINGER, A. Inflammation of Tenon's capsule as a result of influenza. *N. Y. Med. Record*, June 14, 1890.

308. TRUC. L'ophtalmie granuleuse à Montpellier. *Montpellier Mèd.*, 1890, p. 406.

309. WHEELOCK, K. K. Tropho-neurotic keratitis. *N. Y. Med. Record*, July 26, 1890.

ALLEMAN'S (295) method is to place one pole over the cornea, covered by the lids, and the other on the cheek, just below the lower orbital edge. Sometimes it is placed on the naked cornea, rendered anæsthetic by cocaine. He usually begins with a strength of ¼ to ½ milliampère. The histories of ten cases are given. In all cases, even those of many years' standing, improvement was noted, and in some it was very pronounced.

BURNETT.

From the observation of five cases of xerosis of the conjunctiva in children, all of whom died of internal affections, BRAUNSCHWEIG (297) concludes that the bacillus of xerosis is not the cause of the constitutional affection. It is an accidental, harmless settler on previously diseased and disintegrating tissue. Xerosis is only a phenomenon secondary to other pathologico-anatomical changes in the body.

BURNETT (298) again calls attention to the fact, first brought to notice by him in 1876, that the negro in the United States seems to enjoy an immunity from trachoma. He also instances some facts which seem to show that trachoma may flourish at and above an altitude of 1,000 feet. He considers trachoma a dyscrasic affection and not a mere local disease, and that it should be treated accordingly.

H. and O. KEINIG (299) treat trachoma by energetically rubbing the conjunctiva of the lids and fornix with a pledget of cotton, dipped into a sublimate solution (1:2,000), no matter whether it is ulcerous or bleeds. This is repeated once or twice daily. When the granules occupy a spot which is difficult to get at, they

crush them with a ciliary forceps. They also wash out the eyes three times daily with a lukewarm sublimate solution (1:1,000). Sometimes after very energetic rubbing there is intense swelling of the lids; then the friction must be discontinued for one or two days. By this method of treatment the trachoma is completely cured in from two to six weeks, and the corneal affections are also healed.

KOLLOCK (300) describes a form of xerosis occurring in negro children, especially in scrofulous and emaciated subjects. The ocular conjunctiva becomes thickened, greenish-yellow in hue, and is often thrown into folds which are capped with silvery scales. The disease does not follow any form of ophthalmia, frequently gives rise to ring-ulcer of the cornea, and hemeralopia is sometimes complained of. It most nearly resembles a type reported by Bitot and Blessig to have occurred in Russia.

WERNER.

MAGEE (301) reports six cases of corneal ulcer in which the galvano-cautery was used with more or less success in stopping the morbid process. He thinks it specially useful in those cases having their origin in mycotic infection.

BURNETT.

In a patient, into whose eye on account of a corneal ulcer he had introduced a salve composed of white mercurial precipitate, oxyde of zinc, and vaseline, and who was also using an iodine salve on account of orchitis, MÆURER (302) saw cauterization of the conjunctiva. Small quantities of iodine were found in the urine.

GORDON NORRIE'S (303) case was that of a child eight months old, which had fallen ill a few days previously. The lids of both eyes were kept half open; the conjunctiva was dry and slightly scaly, the cornea dry and dull. In the left cornea there was an ulcer with a necrotic protruding mass. After a severe, probably cerebral, disease the child recovered, contrary to expectation. The right eye became entirely normal again, the left was destroyed by panophthalmitis. Compresses dipped in a solution of boracic acid had been constantly applied. SCHIÖTZ.

RAEHLMANN (305) calls trachoma all follicular affections of the conjunctiva. The anatomical and clinical peculiarities of trachoma arise from the changes in the follicles. The follicular conjunctivitis of other authors is trachoma. The formation of follicles takes place either rapidly or slowly. In both forms they spread

in two different ways, they are found either superficially or in the depths. When the superficial follicles develop in an acute manner, the accompanying inflammation is of a catarrhal nature. The mucous membrane is thrown into folds and wrinkles, at the apex of which the follicles are found; the lower lid is particularly affected, especially the fornix. They are more rarely found upon the conjunctiva of the upper lid. In the chronic form there is frequently no sign of inflammatory irritation. The mucous membrane is swollen, the surface wrinkled, the follicles are arranged in rows, but are larger, pale, and diaphanous. Healing may take place both in the acute and chronic forms spontaneously, after a longer or shorter period, without leaving a trace. By many they are called follicular conjunctivitis, and are considered different from trachoma. Raehlmann cannot support this view, as he has seen the most severe kinds of trachoma develop from this condition. In the severe forms there is an extensive proliferation of follicles both on the surface and in the depth of the tissue. The fate of the mucous membrane depends upon the changes in the follicles. It is rough and nodular, slightly or not at all folded, rather tensely swollen. The follicles are crowded together beside, behind, and over one another in the conjunctiva of the lids and the retrotarsal folds. In consequence of perforation of the follicles, ulcerations form, which in turn lead to the formation of scars. The tarsus is curved, and keratitis pannosa may develop. Trachoma is contagious without doubt, but the discharge probably possesses contagious properties only at times. Transmission through the air is impossible.

Rosmini (306) discusses the new teaching of the parasitical origin of the granulations (follicular conjunctivitis) and trachoma, and praises sublimate as the principal remedy; he calls it the king of antiseptics. Dantone.

Schapringer (307) gives an account of a suppurative tenonitis associated with a degree of panophthalmitis in a man affected with phthisis which seemed to be due to the grippe, no other cause being found. The patient was still under observation when the report closed. Burnett.

Wheelock (309) reports three cases of keratitis in which there was infiltration and other signs of inflammation, but without pain, photophobia or lachrymation, and with almost complete anæsthesia of the cornea. They were treated by galvanism, which acted pleasantly and favorably in all the cases. He thinks the

seat of the disease to be in the Gasserian ganglion, from which the trophic nerves seem to come. Internally he gives strychnine.

BURNETT.

310. OBRASZOW and SERGEJEW. A case of keratitis punctata syphilitica. *Wjestnik Ophth.*, 1890, Nos. 4–5, p. 323.

311. SGROSSO ANTONELLI. Contributo, alla anatomia patologica della cornea negli occhi atrofici. *Ann. di ottalm.*, vol. xix., 2, p. 116.

In OBRASZOW and SERGEJEW's (310) patient, a man aged sixty-two and amaurotic from other causes, numerous small dots developed in the parenchyma of the cornea of both eyes (about 50 in the right, 30 in the left), about 1 *mm* in diameter, white, and lying at different depths, about four months after the primary infection, together with several primary sclerosis of the prepuce, swelling of the lymphatic glands, macular and papular syphilides, destruction of the mucous papillæ of the tonsils, and of the mucous membrane of the mouth and lids ; there was also moderate, deep-seated pericorneal injection. At the centre of the cornea they were crowded closer together and were smaller than at the periphery. Between the dots the cornea is almost perfectly clear. Treatment with injections of salicylate of mercury ($\frac{1}{6}$ to $\frac{1}{3}$ of a grm.) caused all the constitutional symptoms to disappear, while the corneal dots also gradually cleared up, each from its centre towards the periphery. It was now found that also the right iris was infiltrated to a very great extent, and became atrophic as the infiltration disappeared. With the disappearance of the corneal dots the author also observed the formation of small depressions in the cornea (without loss of substance), but not corresponding to the dots. They consider this a case of keratitis parenchymatosa punctata, as described by Mauthner, Raehlman, and Fournier, complicated in the right eye with parenchymatous iritis. HIRSCHMANN.

SGROSSO and ANTONELLI (311) describe the changes in the epithelium, Bowman's membrane, and the tissue itself of the cornea of four enucleated atrophic eyeballs. The indentations of the membrane, its complete absence in spots, and especially its perforation by delicate offsets of the parenchymatous cells (canalization of the subepithelial tissue according to de Vincentiis) are carefully shown and illustrated with excellent drawings of the microscopical conditions. DANTONE.

Sections XII.–XXI. Reviewed by DR. P. SILEX.

XII.—IRIS.

312. DUJARDIN. Iridectomie par un procédé simplifié. *Jour. des sci. med. de Lille*, 1890, No. 24. p. 554.

313. VAN DUYSE. Tuberculose oculaire. *Ann. de ocul.*, vol. civ., p. 5.

314. LANGE, O. Tumor corp. ciliar., rupt. capsulæ lentis, catar. consec. traumatica. *v. Graefe's Arch. f. Augenhk.*, vol. xxxvi., p. 277.

315. LEMBECK, H. On the pathological anatomy of total congenital irideremia. *Inaug. Diss.*, Magdeburg, C. Friese, 1890.

316. RIEKE, A. Foreign bodies in the iris. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxviii., p. 375. (A chip of stone in the iris for thirty years with good sight).

317. SEGGEL. Another case of a chip of steel remaining in the iris for years; removal by iridectomy, good sight. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxviii., p. 291.

318. TERSON. Presentation d'une malade opérée depuis sept mois d'une tuberculose de l'iris. *Soc. franç. d'opht.*, May 6, 1890.

319. DE WECKER. La tuberculose de l'iris. *Soc. franç. d'opht.*, April 1, 1890.

320. ZIRM, E. A case of persistent pupillary membrane adhering to the cornea. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxviii., p. 288.

DUJARDIN (312) operated in a case of occlusion of the pupil after cataract-extraction in the following manner: below the horizontal corneal diameter he made two small wounds with a Graefe knife by puncture, counter-puncture, and a few sawing movements. Through one wound he introduced the iris forceps, through the other the pince-ciseaux, and then excised in the anterior chamber a central piece of iris, which he removed with forceps. MARCKWORT.

LANGE (314) finds that only four cases of tumor of the ciliary body accompanied with cataract have been published, and carefully describes one observed by himself. The symptoms always present were unequal depth of the anterior chamber, irregular dilatation of the pupil and dislocation of the opaque lens. The development of these cataracts has been explained in various

ways : the tumor pressing upon the lens was said to cause a disturbance of nutrition similar to choroiditis, others ascribed it to the detachment of the retina and increased pressure, though this explanation referred rather to the later stages, still others laid it to the mechanical insult. Lange found as the cause a rent in the capsule caused by the pressure of the tumor. The latter consisted of hypertrophic and hyperplastic smooth muscular fibres and spindle-shaped connective-tissue cells, and was therefore a myosarcoma.

TERSON (318) showed a patient from whose iris he had excised a tubercle. V increased after the operation from $\frac{1}{10}$ to $\frac{1}{2}$. In a similar case de Wecker could perform only a partial resection ; nevertheless recovery took place. Coppez saw tuberculosis of the iris heal simply under constitutional treatment. Galezowski is opposed to excision ; he saw recovery under constitutional treatment combined with repeated paracenteses of the anterior chamber. MARCKWORT.

DE WECKER (319) reports on two patients with tuberculosis of the anterior part of the uveal tract. Both of these eyes had been condemned to enucleation by other oculists. He succeeded in preserving both by appropriate constitutional treatment (arsenic and iodoform combined with a milk-cure). One eye regained $V = \frac{1}{2}$; the other became slightly phthisical. These cases have induced de Wecker to advise an operative procedure in tuberculosis of the eye when the disease is confined to a small spot, but to refuse to operate (therefore not to enucleate) when the affection has spread to the whole anterior part of the uveal tract. While de Wecker assumes that tuberculosis of the eye is generally due to endogenous infection, Chauvel and Parinaud hold the opposite view. Vignes and Parinaud therefore advocate enucleation in case the functions of the eye in question have been destroyed. Despagnet is opposed to iridectomy for excising the tubercle, as it is impossible to know whether the process is confined to the iris. Abadie and Gillet de Grandmont assert that the diagnosis cannot be considered certain until tubercle bacilli have been shown to exist and inoculations have succeeded. In regard to the technique of iridectomy for tuberculous nodules de Wecker states that he first makes a small incision through the cornea above the nodule, and enlarges it downward with the scissors, as the peripheral position of the tubercle makes the usual form of incision impossible. MARCKWORT.

XIII.—CHOROID.

321. Bock, E. Contribution to the knowledge of the neoplasms of the eye. *Centralbl. f. prakt. Augenhk.*, vol. xiv., p. 1.

322. Garnier, R. Contribution to the knowledge of panophthalmitis. *Wjestnik Ophth.*, 1890, Nos. 4 and 5.

323. Guende. Une observation de néoplasme choroidien developpe chez une femme atteinte de cancer du rein. *Rec. d' opht.* 1890, p. 325, and *Soc. d'opht. de Paris*, June 3, 1890.

324. Pincus, O. Case of choroidal sarcoma. *Deutsche med. Wochenschr.*, 1890, p. 791.

325. Sgrosso. Neoformazione di cartilagine nella membrana ciclitica e tessuto neoformato prechoroideale di un occhio atrofico, *Ann. di ottalm.*, vol. xix., 2, p. 178.

326. Trousseau. Iridochorioidite cataméniale. *Soc. d'opht. de Paris*, June 3, 1890.

Bock (321) describes a sarcoma of the choroid in a child aged three, a melano-carcinoma of the limbus, a sarcoma polyposum of the ocular conjunctiva, and a glioma of the retina.

According to Garnier (322) the term "panophthalmitis" belongs to a group of symptoms, a clinical picture, which may be based on various pathological processes and etiological factors. In proof he minutely describes five eyeballs, enucleated on account of panophthalmitis and examined by himself (one after injury, four after cataract extraction). For the details of the pathological changes in the iris, choroid, retina, vitreous, and papilla the original must be consulted. Microbes were present in all, though they showed nothing specific. Some resembled the septicæmic streptococci, others the pus-staphylococci; many varieties of micrococci were found. Cultures did not succeed. In one case the microbes entered by way of a prolapse of iris, in three others remnants of lens-capsule prevented adaptation and healing of the wound, so that the microbes obtained access. The manner in which the vitreous was infiltrated with pus confirms, in the author's opinion, the view of Straube, that the vitreous is divided into concentric, funnel-shaped layers by eight to ten membranes extending from the papilla to the ora serrata. The two layers, the uveal and retinal, genetically different from the iris, may become affected independently of each other and in a different manner. Endovasculitis obliterans occurs both in inflammation of the stroma of the iris and in anterior synechiæ and

prolapse of iris. The marked infiltration of the ciliary body with cells is due to the great vascularity. The author never saw proliferation of the muscular elements. The œdema of the papilla can generally be explained by the checked escape of the liquids of the eye. He never found dropsy of the sheath of the optic nerve. HIRSCHMANN.

PINCUS (324) found a melanotic sarcoma in a phthisical eyeball. Graefe has already described such globes affected with sarcomas of the choroid. The eyeballs are painless, the form peculiar, as the axis is small, while the lateral diameter is large. Extraocular masses of tumor lying behind the eyeball sometimes cause a slight degree of exophthalmus.

SGROSSO (325) found several deposits of hyaline tissue in the so-called cyclitic membrane of an exceedingly small atrophic eyeball. DANTONE.

TROUSSEAU (326) describes a peculiar form of iridochoroiditis with hypopyon, which always began in a patient a few days before the menses and disappeared in a few days. This state of affairs lasted for a long time. With the beginning of pregnancy the attacks ceased for a time; one month before delivery, however, another attack set in; the next occurred before the second menses. After that they regularly returned. Gorecki, Duboys de Lavigerie, and Despagnet report similar cases during the discussion. MARCKWORT.

XIV.—GLAUCOMA.

327. BIRNBACHER. Contribution to the anatomy of acute glaucoma. Graz, 1890.

328. COLLINS. Iridescent vision in glaucoma. *Ophth. Rev.*, vol. ix., p. 196.

329. FANO. Le glaucome. *Journ. d'ocul. et de chir.*, 1890, p. 151.

330. ROGMAN. De l'hyphéma post-opératoire. *Ann. d'ocul.*, vol. civ., p. 139.

331. STÖLTING. Cure of buphthalmus in two cases. *v. Graefe's Arch. f. Augenhk.*, vol. xxxvi., 3, p. 263.

BIRNBACHER (327) accidentally had an opportunity to examine an eye affected with glaucoma. For details the original must be consulted. It is worthy of note that the vitreous was free from changes. An abnormal arrangement of the column of blood was

found in the capillaries, the smaller and medium-sized veins of the choroid, manifesting itself in an increase and marginal position of the leucocytes, the walls of the blood-vessels being intact, and also in an increased albuminous exudation. Chronic pathological proliferations of the endothelium were found in the two upper vortex veins. These latter changes he and Czermak had demonstrated years ago in chronic glaucoma also. As long as the circulation is normal in other respects, no disturbances will probably result. But when other alterations besides supervene, for instance, increased afflux or diminished efflux, compensation may become impossible, and a sudden increase of tension is the result.

From the results of experiments with erythrophleine COLLINS (328) concludes that the colored halos produced by it, and those which occur in glaucoma are due to the same cause, viz.: steaminess of the cornea from superficial epithelial changes. Erythrophleine produces slight anæthesia and steaminess of the cornea with foggy vision and colored halos, but no increase of tension. As in glaucoma, the red ring was outermost, independently of the refraction. The halos were independent of fixation of the light, accommodation, size of pupils, and presence or absence of the lens. WERNER.

FANO (329) discusses the various kinds of glaucoma. In regard to the treatment of simple glaucoma, he says neither iridectomy, nor sclerotomy, nor the production of a so-called filtration-scar cures that form of glaucoma. MARCKWORT.

ROGMAN (330) publishes a very interesting paper, in which he calls attention to the fact that in consequence of hemorrhage into the anterior chamber after an operation, the tension can be markedly increased. He cites three cases in confirmation of this view. In the first two cases the hemorrhage occurred during the operation, and in the third, two days later, the increase of tension always simultaneously with the hyphæma. Repeated punctures had a good effect. He then thoroughly discusses the literature of the subject. MARCKWORT.

STÖLTING (331) performed sclerotomy for buphthalmus on a child seven months, and on another two years old, and considers the cases cured. They were under observation for eighteen months. In one eye the iris prolapsed and a cystoid scar formed. [In such cases Prof. Schweigger has performed iridectomy for many years, as only rarely good results were ob-

tained in adults with sclerotomy. The reviewer has had several such patients under observation for four or five years, but would hesitate to say that they are cured. He will report later as to the results.]

XV.—SYMPATHETIC OPHTHALMIA.

332. AYRES, S. C. Case of sympathetic inflammation after panophthalmitis of the injured eye. *Amer. Journ. Ophth.*, Nov., 1890.

333. BRAILEY. Discussion on sympathetic ophthalmia. *Brit. Med. Journ.*, 1890, p. 411.

334. GALEZOWSKI. De l'ophtalmie sympathique et du moyen de traitement par un debridement circulaire du globe oculaire. *Rec. d'opht.*, July, 1890, p. 138.

335. TEILLAIS. Deux cas d'ophtalmie sympathique. *Soc. Franç. d'opht.*, May 6, 1890.

In AYRES' (332) case there was suppurative panophthalmitis following an injury to the eye from broken glass. The eye atrophied. Four months later the other eye began to be affected with plastic iritis of a slow form. The stump was not sensitive, but was removed. BURNETT.

The discussion was opened by BRAILEY (333), who made the following remarks: The exciting eyes exhibit a plastic uveitis with clusters of cells in the iris, ciliary body and choroid, but the chorio-capillaris and pigment-epithelium generally escape. Sympathy occurs after serous and suppurative disease also, and from non-perforating tumors. Papillitis was the first sign in 10 per cent. of all cases, in 5 per cent. it does not go further, it is generally a serous uveitis with punctate keratitis and + T. It seems to travel through the nerve-sheaths, and then along the vessels or episcleral tissue. The bacillary theory does not explain its non-appearance after suppuration, and in non-perforating tumors. Deutschmann described his well-known experiments on the subject. Story considered that the general septicæmia which occurred in these experiments lessened their value. WERNER.

GALEZOWSKI (334) believes that the cause of every sympathetic affection must be sought in the ciliary nerves. Instead of enucleation he makes an operation which so detaches the eyeball from its surroundings, that only the connection with the muscles and conjunctiva remains. For this purpose Galezowski

enters Tenon's capsule with curved scissors at the four recti muscles. On the nasal side he excises at the same time a piece of the optic nerve. MARCKWORT.

According to TEILLAIS (335) sympathetic ophthalmia may develop in consequence of a slight contusion, without the aid of any infection. Sympathetic ophthalmia of ciliary origin cannot therefore be abandoned. The course of this disease differs materially from that of ophthalmia migrans. Abadie and Boucheron agree with Teillais. In this form of sympathetic ophthalmia enucleation, which is insufficient in ophthalmia migrans, is especially indicated. In these cases Boucheron found neuritis of the ciliary nerve. MARCKWORT.

XVI.—LENS.

336. ASTENGO. Lavaggio della camera anteriore nell' operazione di cataratta. *Boll. d'ocul.*, vol. xii., p. 16.

337. BOURGEOIS. De la Kystectomie dans l'opération de la cataracte. *Rec. d'opht.*, Aug., 1890, p. 456.

338. DUFOUR. De la cataracte secondaire au point de vue opératoire. *Soc. franç d'opht.*, May 6, 1890.

339. FAGE. Infection tardive de l'œil après l'opération de la cataracte. *Ann. d'ocul.*, vol. civ., p. 36.

340. FROTHINGHAM, G. E. A case of static lenticular astigmatism acquired by long-continued use of spectacles having a faulty position. *Jour. Amer. Med. Assoc.*, Oct. 25, 1890.

341. MCHARDY. Treatment of immature senile cataract. *Ophth. Rev.*, vol. ix., p. 254.

342. KALISH, R. The absorption of immature cataract by manipulation conjoined with instillation. *N. Y. Med. Rec.*, Dec. 20, 1890.

343. KERSCHBAUMER, R. Report on 200 cataract extractions. *Arch. f. Augenhk.*, vol. xxii., Nos. 2 and 3, p. 127. This number of these ARCHIVES.

344. KNAPP, H. On extraction of lenses dislocated into the vitreous. *Ibid.*, p. 171.

345. KNAPP, H. Division of the capsule during the corneal section in cataract extraction. *Ibid.*, p. 186.

346. KNAPP, H. Report on a third hundred of cataract extraction without iridectomy. *Ibid.*, p. 191.

347. LEDDA, S. Délire chez les opérés de cataracte. *Rec. d'opht.*, 1890, p. 398.

348. NIKOLJUKIN, N. Report on 304 cataract extractions, performed in 1888 and 1889 at the Peter-Paul Hospital. *Wjestnik Ophth.*, July–Oct., 1890.

349. PARINAND. Du délire après l'opération de la cataracte. *Soc. franç d'opht.*, May 7, 1890.

350. PITTS, BARTON. Cataract extraction. *N. Y. Med. Rec.*, Oct. 18, 1890.

351. POPOW, A. Report on 103 cataract extractions. *Wjestnik Ophth.*, July–Oct., 1890.

352. ROLLAND. De l'opération de la cataracte chez les malades ambulants et de la responsibilité médicale qu'elle entraine. *Rec. d'opht.*, 1890, p. 216.

353. SCHWEIGGER, C. On extraction of unripe cataracts. *Deutsche med. Wochenschr.*, 1890, p. 695.

354. SCIMENI. Sulla modificazione della curratura della cornea in seguito ad estrazione di cataratta. Osservazioni ophthalmometriche. *Ann. di ottalm.*, vol. xix., 3, 4, p. 211.

ASTENGO (336) reports on 16 extractions in which he did not perform iridectomy, but washed out the anterior chamber according to de Wecker. The result was excellent in all of them.

DANTONE.

BOURGEOIS (337) has constructed a new capsule-forceps, with which he removes a piece of the anterior capsule in opening the lens-capsule. After the former has been seized near the centre, the capsule is rotated about its longitudinal axis and then withdrawn. The object therefore is not to tear out a piece of the anterior capsule by traction, but by torsion. MARCKWORT.

DUFOUR (338), after discussing the operation of secondary cataract in every direction in his review, comes to the following conclusions: 1. The operation for secondary cataract is justified only when unpleasant consequences can be excluded. 2. It is now possible to completely avoid infection in this operation. 3. The operation is indicated only when V has been reduced by the secondary cataract to less than $\frac{4}{10}$. 4. At least 6 to 7 weeks must elapse between the extraction and the operation of the secondary cataract. 5. The operation is performed with a needle, when there is merely a membrane; with Graefe's Knife, when then there are iritic adhesions; with the pince-ciseaux,

when there is a thick, firm (inodulaire) secondary cataract. 6. The needle must be so made that bits of the secondary cataract will not easily adhere to it and be drawn into the corneal wound. De Wecker recommends to divide the capsule according to Green at right angles to the direction of the traction of the iris. In the discussion a great difference of opinion manifested itself as to the advantages of the different instruments. Panas, Wecker, and Suarez de Mendoza prefer the pince-ciseaux; Martin and Motais Graefe's Knife; Galezowski the instrument of Desmarres or a curved needle, and Meyer the small hook. To the question of Lasalle and Dor, as to how the complete secondary cataract should be operated upon, which does not form until a long time after extraction, Dufour answers: by iridocapsulotomy according to Wecker, therefore with the pince-ciseaux.

MARCKWORT.

FAGE (339) publishes two new cases of panophthalmitis in eyes previously operated on for cataract. In the first case in which the affection developed 4 months after the extraction, enucleation was performed. In the second case, in which the extraction had been done 10 years previously, the disease was checked with Saemisch's incision and antiseptic treatment. MARCKWORT.

FROTHINGHAM (340) reports the case of a young man who showed an astigmatism of 0.75, axis vertical, after a long-continued use of glasses of + 3 D for near work, which were so fitted in the frame as to stand at an angle of 23° with the vertical meridian. At a previous examination under prolonged use of atropine he had manifested a H of 0.75 D. BURNETT.

MCHARDY (341) adopts Foerster's method of maturing cataracts, performing preliminary iridectomy at the same time, whenever vision becomes less than $\frac{5}{24}$. It ripens a senile cataract in from eight days to eight weeks. Rupture of the capsule is very uncommon, slight iritis often occurs, and the cortex is not sticky. Panas, Snell, and others approved of the method.

WERNER.

KALISH (342) reports the histories of seventeen cases of lenticular opacities, many of which are figured, which were treated by his method of manipulation, or rubbing of the eye through the lids after instillation of glycerine, boric acid, and rose-water. The opacities were mostly diffuse and of recent date. The paper was discussed (disapprovingly, Ed.) by the ophthalmologists at a meeting of the Medical Society of the County of New York.

BURNETT.

LEDDA (347) reports on some more cases of delirium after extraction, and even after the simple instillation of atropine (5 or 6 drops of a solution of 0.05 to 30.0), without an operation or bandage. Ledda recommends chloral, bromide of potassium, and especially hydrobromate of quinine to prevent the delirium.

MARCKWORT.

NIKOLJUKIN (348) operated on the first eighty-six eyes according to v. Graefe's method (linear, peripheric extraction), and had panophthalmitis in two cases (accidental infection), occlusion of the pupil in four, glaucoma in one (serous iritis), protracted course of healing in five, with good result, however; incarceration of the iris in five, but without injurious consequences, and thickening of the capsule in four. To prevent injurious consequences, Nikoljukin laid the section entirely in the cornea in the following fifty-five eyes. Among these he had one case of iridocyclitis, terminating favorably; two of occlusion of the pupil; one of suppuration, ending also in occlusion of the pupil. In two, sight was poor, on account of thickening of the capsule. To prevent secondary cataract, Nikoljukin endeavored to remove the lens within the capsule in the following thirty-one eyes. He extracted it with the loop. In most of them, prolapse of vitreous took place (being entirely absent in only twelve); but he ascribes no special importance to it. In one case, panophthalmitis occurred, in one occlusion of the pupil, in one detachment of the retina, which the author, however, is not inclined to ascribe to the loss of vitreous. In spite of good results, and to prevent the rupture of the capsule and the failure of the extraction within the capsule, Nikoljukin did not remove the lens in this manner in patients of middle age, in increased intraocular pressure (when the eyeball remains tense after the corneal section) and in liquefaction of the vitreous. In consequence he did not have any loss of vitreous in twenty-one among the following sixty-two cases. In thirty-three the extraction was performed without iridectomy (generally in hypermature cataracts). In seventeen he obtained a round pupil, in thirteen it was drawn upward and irregular, in three incarceration took place. The best vision was obtained in cases with a round pupil. Double vision was present: the image belonging to the right eye stood to the right and lower and its upper end tips outwards. When the head is inclined, double vision cannot be produced, even with colored glasses. For his explanation, the original must be consulted. HIRSCHMANN.

PARINAUD (349) discusses the causes of delirium, which frequently occurs three days after extraction. Without denying the influence of atropine and alcoholism, he considers the occlusion of the eyes the principal cause. Armaignac holds the same view. Grandclément and Galezowski accuse atropine in particular; Chibret, alcoholism. MARCKWORT.

In more than one hundred cases of extraction, one fourth of which were without iridectomy, PITTS (350) has not had a single instance of corneal suppuration, plastic iritis, or panophthalmitis. Two failures in eyes which were diseased before operation, in all the others V ranged from $\frac{20}{30}$ to $\frac{20}{20}$. BURNETT.

POPOW (351) had eight losses among his first forty-two operations, which were done under very unfavorable hygienic conditions. Among the next sixty-one, done under more favorable auspices, there were only five losses. The minute statistics are unsuitable for review. In suppuration and blennorrhœa he obtained good results with instillations of a solution of chinin. sulph. gr. viii. ad ℥ j. HIRSCHMANN.

ROLLAND (352) discovered that some oculists treat cataract patients like out-door patients. They let them walk or ride home immediately after the operation had been performed in the consulting-room. He severely condemns the procedure, and thinks it so objectionable that it should be punished by law.

MARCKWORT.

SCHWEIGGER (353) thinks that the terms ripe and unripe cataract are improper as regards the question of the operation. The point to be settled is whether the lens is in a condition to be extracted, *i. e.*, whether it can be removed without leaving any larger remnants behind. This is possible when the lens has lost its elasticity, *i. e.*, when it has become flatter and the power of accommodation has disappeared. This happens at about the age of sixty, and every lens causing marked disturbances of vision can therefore be extracted at that time of life, even when considerable portions of it are still clear. At an earlier time, between forty and sixty, the clear portions form a sticky substance, which remains behind after extraction, swells, and frequently destroys the eye by rendering the cornea opaque and causing choroiditis. To render such a patient able to work again, an operation is also advisable, but not until after previous ripening by massage according to Foerster, which may also be done without iridectomy. In young persons division is indicated.

SCIMENI (354) has undertaken a second series of ophthalmometric measurements of the cornea after cataract extractions (in which he also took into consideration the periphery) and has found: (1) that the cornea does not lose its ellipsoid form after extraction, and that the meridians passing through the line of vision generally remain elliptical, as before the operation; (2) that the curvature increases in the meridians parallel to the section, that the angle α decreases but remains positive; (3) that the eccentricity of the ellipse diminishes in the meridians perpendicular to the section, so that the curvature of the cornea approaches the sphere, the angle α becomes larger in the positive direction, the angle α' almost zero, while the apex of the ellipse falls below the centre of the meridian. These changes are most marked soon after the operation, and subsequently disappear in many cases. DANTONE.

XVII.—VITREOUS.

355. HIRCSHBERG, J. On the formation of blood-vessels in the vitreous. *Centralbl. f. prakt. Augenhk.*, vol. xiv., p. 266.

HIRSCHBERG (355) saw in four patients formation of blood-vessels into the almost clear vitreous, following hemorrhagic inflammation of the retina and optic nerve. He seeks the cause for the latter in diabetes, syphilis, and arterio-sclerosis. The blood-vessels may disappear.

XVIII.—RETINA AND FUNCTIONAL DISTURBANCES.

356. ABADIE. Traitement du décollement de la rétine. *Soc. franç. d'opht.*, May 7, 1890.

357. ADAMÜÇK, E. On detachment of the retina. *Wjestnik Ophth.*, July–Oct., 1890.

358. BERNHARDT, P. On disturbances of the visual field and changes in the optic nerve in neurasthenia and hysteria. *Inaug. Diss.*, Zurich, 1890. A. DIGGELMANN.

359. BJERRUM. Et tilfcelde of hemianopsia partialis. Helbredelse. Localdiagnose mulig. *Nord. ophth. Tidsskr.*, vol. iii., 2, p. 71. Copenhagen, 1890.

360. DUNN, JOHN. A case of reflex amblyopia cured by section of the supraorbital nerve. *N. Y. Med. Jour.*, Aug. 9, 1890.

361. GOLDZIEHR. On a case of endarteritis obliterans. *Wiener med. Wochenschr.*, 1890, No. 3.

362. GRÓSZ, E. The treatment of detachment of the retina. *Szemészet*, 1890, No. 1.

363. GRÜNTHAL. Retinal hemorrhages in intoxication with hydracetine. *Centralbl. f. prakt. Augenhk.*, vol. xiv., p. 73.

(The affection is ascribed to the changes in the walls of the blood-vessels, caused by the destruction of the red blood-corpuscles.)

364. HESS, C. Examination of a case of semilateral disturbance of the color-sense in the left eye. *v. Graefe's Arch. f. Ophth.*, vol. xxxvi., 3, p. 24.

365. HEYNE. A case of general cutaneous and sensory anæsthesia. *Deutsches Arch. f. klin. Med.*, vol. xlvii., Nos. 1 and 2, p. 75; in the same, a paper by Ziemssen on the same subject.

366. JAVAL. Scotome scintillant. *Soc. d'opht. de Paris*, July 1, 1890.

367. LAGRANGE. Contribution à l'étude anatomique et clinique du gliome de la rétine. *Arch. d'opht.*, 1890, vol. x., 5., p. 85.

368. MASSELON. Des altérations consécutives aux hémorrhagies de la rétine. *Soc. franç. d'opht.*, May 8, 1890.

369. NAUMOFF. Some pathologico-anatomical changes in the fundus of the eyes of new-born children. *v. Graefe's Arch. f. Augenhk.*, vol. xxxvi., 3, p. 180.

370. OTTOLENGHI. The visual field of epileptics (when free from an attack) and of congenital criminals (morally insane). *Centralbl. f. Nervenkrankh. u. Psychiatrie*, 1890, vol. xiii., p. 289.

371. PRÖBSTING, A. A case of retinitis proliferans. *Zeh. klin. Monatsbl. f. Augenhk.*, 1890, p. 73.

372. RAMPOLDI. Cecità unilaterale sequita a fissazione del sole in parziale eclisse. Reporto endoftalmoskopico negativo. Inefficazia di alcuni mezzi terapeutici. Guarizione rapida ottenuta colle fumigazioni di fegato di bue. *Ann. di ottalm.*, vol. xix., 3 and 4, p. 263.

373. SCHLEICH, G. A contribution to the development of spontaneous new formation of connective tissue in the retina and vitreous. Retinitis proliferans. *Zeh. klin. Monatsbl. f. Augenhk.*, 1890, p. 63.

374. SCHÖLER. The operative treatment of detachment of the retina by injection of iodine into the eyeball. *Berliner klin. Wochenschr.*, 1890, No. 34.

375. DE SCHWEINITZ, G. E. A series of cases presenting minor lesions at the macula lutea. *Journ. Amer. Med. Asso.*, Oct., 1890.

376. TIFFANY, FLAVEL B. Cécité amenée par la quinine ou amaurose quinique. *Rec. d'opht.*, 1890, p. 321.

377. WEISSENBERG. A contribution to the knowledge of the disturbances of reading based upon a case of dyslexia. *Arch. f. Psych. u. Nervenkrankh.*, vol. xxii., 2, p. 414.

ABADIE (356) again recommends injections of iodine (iodo-iodurée) in detachment of the retina. He had a special knife constructed for this purpose, the handle of which forms a Pravaz syringe. Boe is opposed to these injections. In simple detachment of the retina by a subretinal exudation Abadie resorts to puncture; in complete detachment he does not interfere. According to Guende's report Despagnet injects sublimate (1:2000).

MARCKWORT.

In opposition to Logetschnikow, who doubts the correctness of the diagnosis of temporary detachment of the retina in albuminuria of pregnant women, with œdema and eclamptic attacks, considering them retinal œdema, ADAMÜCK (357) describes a case of binocular, total funnel-shaped undoubted detachment of the retina, which had developed in a woman aged thirty in the eighth month of pregnancy during a severe eclamptic attack—$V=\frac{1}{60}$. It rapidly improved after prematurely-induced delivery of the child, which was resorted to; a few days later, only a slight detachment in the lower part of both eyeballs was found, which a week later had entirely disappeared, with $V=\frac{20}{60}$. As to the development of detachment the author expresses the opinion that it can only take place when the volume of the vitreous has been diminished or ectasia of the sclera has taken place. An injury may break up the vitreous, convert it partly or entirely into free liquid or fibrous tissue (remnants of the supporting tissue), which Adamück experimentally imitated on the vitreous in a rubber bladder, and then only can the retina become detached. When the vitreous is healthy, neither an exudation nor a rent in the retina can cause detachment.

HIRSCHMANN.

The results of BERNHARDT'S (358) investigations may be summed up by saying that there is not only a general extensive

contraction in the diseases in question, but only one color is found with good external limits for white. It resembles the condition of incipient atrophy. This circumstance should make us cautious in utilizing the outlines of the visual field. Sometimes the temporal half or even the whole optic nerve shows a slight pallor; this need not be considered atrophy, though the visual field may indicate it, for it disappears again.

Mr. N. N., aged forty-three, had two years previously in the right eye a small central scotoma, which soon disappeared. Lately he has had difficulty in reading. O. D. V = $\frac{5}{12}$, O. S. $\frac{5}{6}$. The visual field, when examined in the usual manner, was found of normal extent in both eyes. Leftsided homonymous hemianopsia for colors. When tested with very small white objects ($2\frac{1}{2}$ *mm* diameter, distance 2 *m*), leftsided homonymous hemianopsia was found in both eyes. With the aid of the same test-objects BJERRUM (359) could demonstrate in both eyes a small absolute scotoma to the left of the point of fixation. In the right eye this scotoma gradually extended in the course of the disease beyond the point of fixation into the right half of the visual field. No changes visible with the ophthalmoscope. The author thinks the seat of the disease is at the upper boundary between the right tractus and chiasma. SCHIÖTZ.

In DUNN'S (360) case a boy of nineteen was struck on the right eye by a snowball. No affection of sight at the time, but six months later it began to fail, and the loss was gradual until it was reduced to $\frac{8}{200}$ in the right, $\frac{18}{10}$ in the left eye. There was also constriction of the visual field and some increase of tension, and the anterior chamber was shallow; media clear, fundus normal. Pain on exposure to wind and a constant painful winking. Tenderness over supraorbital nerve. He was treated for syphilis and gave up tobacco without benefit. Section of the supraorbital nerve gave instant relief to the painful symptoms, and vision returned gradually to $\frac{18}{8}$ in both eyes. BURNETT.

GRÓSZ (362) reviews the methods of treating detachment of the retina, and reports the results of sixty-nine cases treated at the Budapest eye clinic. Injections of tincture of iodine failed.

HESS (364) examined a technicist aged thirty-one, in whose left eye sight and color-perception had diminished. No ophthalmoscopic changes. The power of recognizing red and green had completely disappeared in the nasal half of the retina of the left

eye, while that of blue and yellow was only diminished but to the same extent. The power of recognizing black and white was also somewhat impaired.

In HEYNE'S (365) case V in the right eye was $\frac{1}{4}$, in the left $\frac{1}{10}$, 4 D of H and normal fundus; the sense of touch and temperature of the skin and mucous membrane, the sense of pressure and localization, and the perception of pain were paralyzed. The sensibility of the muscles was abolished. The sensibilities were absent, and the functions of all the organs of sense were defective. By closing the ears and bandaging the eyes, thereby removing all excitation, sleep could be produced at once. The patient recovered. The nature of the disease has not yet been discovered.

JAVAL (366) showed the Soc. d'opht. de Paris representations of the scotoma scintillans. They were made by a prominent artist after observations upon himself and show the different stages of scotoma. He adds an accurate description of the scotoma observed upon himself. (Everyone who has had the opportunity of observing the scotoma on himself will agree in declaring both the drawings and the descriptions excellent. —Rev.) MARCKWORT.

LAGRANGE (367) believes that the dangers of glioma are not infrequently overrated. He enucleated the left eye of a boy aged seven for glioma, and the child was still in perfect health two years later. In this case the glioma was an endophytic one, according to Hirschberg's classification, though its origin in the retina could no longer be determined. It occupied the lower outer part of the interior of the eye and had left the anterior part of the eye intact. v. MITTELSTÄDT.

MASSELON (368) discusses the changes following hemorrhages into the retina, especially the fatty degeneration of the parts affected. Such hemorrhages may occur also in progressive myopia, besides in arterio-sclerosis, in conjunction with the fatty degeneration just mentioned. According to Wecker's experience atrophy of the optic nerve often follows extensive retinal hemorrhages. Galezowski opposes Wecker in this respect.

MARCKWORT.

NAUMOFF (369) examined under the microscope the eyes of forty-seven new-born children, who had died during or soon after birth, and found changes similar to those observed in the first stages of choked disc, retinal œdema, infiltration of the retina

with a finely granular albuminous substance, and hemorrhages of different size and shape in the retina and choroid. The hemorrhages in the granular layers did not spread in the direction of the radiating fibres, as in adults, but at right angles to them. They are due to rhexis and diapedesis in protracted labor and constricted pelvis, and are the result of the marked choking up of the blood and the increase of the intracranial pressure. It is a curious fact that the hemorrhages are absorbed without leaving larger patches visible with the ophthalmoscope. Afterwards such cases are designated as cases of amblyopia congenita. The so-called congenital atrophy of the optic nerve might sometimes be referred to the change in the optic nerve just described. The central coloboma may also be due to the affections in question.

OTTOLENGHI (370) found in the epileptics and congenital criminals a marked limitation of the visual field. The outer parts in particular are affected, and show a peculiarly ragged outline.

RAMPOLDI (372) reports on a uniocular amaurosis which had developed in a young girl after she had observed the eclipse of the sun on June 17, 1890, for about five minutes through a slightly smoked glass. $V=\frac{1}{\infty}$, pupil immovable, no ophthalmoscopic changes. After numerous remedies had been tried for three weeks without avail, the author subjected the patient for twenty to twenty-five minutes to fumigation with fresh ox-liver, an old empiric remedy in hemeralopia. Recovery rapid. DANTONE.

From the observation of two cases, in which hemorrhage into the retina and vitreous had previously taken place, SCHLEICH (373) thinks that in such cases the development of connective tissue takes place in these hemorrhages from the retinal blood-vessels.

SCHÖLER (374) claims to have obtained eight cures among twenty-eight cases. He includes three cases in which the detachment was still present but sight was much improved.

DE SCHWEINITZ (375) describes some groups of cases in which vision is normal and without known cause some changes are found in the region of the macular lutea, usually slightly above and to the temporal side. They are generally oval in shape, of varying tints, but mostly grayish-white or buff-colored, and occasionally associated with semi-granular pigment. They vary in size from one to four diameters of a retinal vein. The groups are. 1. Asymmetrical lesion situated in the macular region of the eye presenting the greater error of refraction. Ten cases. 2.

Symmetrical mascular changes—symmetrical refractive errors. Four cases. 3. Asymmetrical lesions, situated in the macular region of the eye presenting the smaller error of refraction. Four cases. 4. Symmetrical macular changes, asymmetrical refractive errors; probable influence of constitutional derangement. Five cases. 5. Slight macular changes, the apparent result of exposure to bright sunlight. One case. BURNETT.

FLAVEL B. TIFFANY (376) saw quinine amaurosis in a man, aged thirty-four, following a dose of 1.95 grm. At first there was complete amaurosis, but improvement gradually took place, so that after sixteen days the patient could read again. No exact statement as to the acuteness of the sight regained is given. The optic nerve and retina were of a whitish color and anæmic.

MARCKWORT.

In a fatal case of dyslexia WEISSENBERG (377) found an angiosarcoma in the occipital lobe. He theorizes as to the cause of dyslexia and thinks it may be a purely functional symptom, and that recovery may take place.

XIX.—OPTIC NERVE.

378. DEUTSCHMANN, R. Contributions to ophthalmology Hamburg and Leipzig, L. Voss.

379. HANSEN, C. M. Et tilfcelde af akut retrobulbar neuritis. *Nord. ophth. Tidsskr.*, vol. iii., 2, p. 68. Copenhagen, 1890.

380. JENSEN, E. Om de met central Scotum forlöbende Ciensygdomine. *Nord. ophth. Tidsskr.*, vol. iii., 1, p. 33.

381. MARTIN, J. De l'atrophie du nerf optique et de sa valeur pronostique dans la sclérose de la moëlle épinière. Paris, 1890, Asselin et Houzeau.

382. MOELI, C. Changes in the tractus and optic nerve in diseases of the occipital lobe. *Arch. f. Psychiatrie u. Nervenkrankh.*, vol. xxii., 1, p. 73.

383. SUTPHEN, J. Sarcoma of the optic nerve, notable chiefly for its size and shape. *Trans. Amer. Ophth. Soc.*, 1889.

384. WEYERT. The heredity of coloboma of the optic nerve. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxviii., p. 325.

DEUTSCHMANN (378) reports several clinical histories, and adds some remarks partly on the basis of clinical observation, partly of pathologico-anatomical examination. They concern

among others the pathology of the optic nerve and its entrance, homonymous hemianopsia after cranial injury, amaurosis from autointoxication in carcinomatosis, spontaneous detachment of the retina with deepening of the anterior chamber, and some rare forms of tumor of the eye.

JENSEN (380) found among 60,125 patients of Hansen's clinic at Copenhagen 259 cases with central scotoma, divided into the following groups: (1) Amblyopia centralis, 189 cases, generally people beyond thirty. Causes, abuse of tobacco and alcohol. There is never an absolute scotoma for white objects when tested as usual with the perimeter. Typical color-scotoma. Vision rarely sinks below fingers at 4 to 5 *m.* Recovery or improvement is the rule; it never ends in atrophy. (2) Stationary scotomatous atrophy of the optic nerve. Twenty cases, men exclusively, usually between the ages of twenty and twenty-five. Hereditary basis, general weakness, or no traceable cause. The disease develops either suddenly or reaches its maximum in a short time without disturbing the general health; it generally manifests itself in both eyes at the same time. There is a central scotoma of the same size and shape as in central amblyopia, but of much greater intensity; fixation is therefore uncertain or eccentric. The periphery is normal. The ophthalmoscope reveals atrophy of the optic nerve, often at an early stage. The prognosis as to restitution is bad, as to blindness absolutely good. (3) Progressive scotomatous atrophy of the optic nerve. Twenty-three cases, men between the ages of forty and fifty, who generally have had syphilis. This disease shows tabic prodromal symptoms, such as immobility of the pupil, myosis, etc. It begins with central amblyopia, color-scotoma with normal periphery. Afterward the color-field contracts and finally also the field for white becomes smaller. It ends in complete atrophy of the optic nerve. It is not an independent disease, but is a special form of development of the tabic atrophy of the optic nerve. (4) Binocular scotomatous optic neuritis. Eleven cases.

According to MARTIN (381) the development of atrophy of the optic nerve is prognostically of great importance for the further course of tabes. With the beginning of amaurosis the disturbances of motility which have already developed do not disappear, but frequently the pains cease, or at least become less. The tabes remains stationary after the loss of sight.

MARCKWORT.

MOELI's (382) cases were cases of parencephalitis and hydrocephalus internus in younger persons with atrophy of the optic nerves and the tractus. From this he concludes that destruction of the undeveloped brain, when it affects the white substance of the occipital lobe is combined with atrophy of the optic nerves and tractus. In a third patient, aged forty-four, he found atheromatous degeneration in both occipital lobes, more or less marked changes in the optic-fibre portions of the mid-brain, and only slight degeneration in the optic nerves and tractus. Further investigations must show whether in adults in affections of the occipital lobe changes regularly take place in the mid-brain, whether they spread towards the periphery, etc. No definite conclusions can be drawn from the literature of the subject, as in the affections mentioned changes were sometimes found in the optic nerves, sometimes not.

SUTPHEN's (383) patient was a girl of ten years, with a movable tumor over the left orbit which extended back into the latter by a pedicle which was found attached to the optic nerve, which was very much swollen. The globe was entirely absent, it having atrophied two years ago as a result of inflammation, probably caused by the tumor. BURNETT.

WEYERT's (384) were cases of simple coloboma of the optic nerve found in three generations, becoming less marked from the older to the younger children, and from the older to the younger generation. The functions of the eyes were normal.

XX.—INJURIES, FOREIGN BODIES (PARASITES).

385. COPPEZ. De l'intervention chirurgicale dans les blessures de l'œil avec pénétration des corps étrangers. *Soc. franç. d'opht.*, May 5, 1890.

386. FANO. Un nouveau cas de conservation de l'œil atteint d'une blessure grave. *Journ. d'ocul. et de chir.*, 1890, p. 171.

387. GAST, R. Case of intraocular cysticercus. *Zeh. klin. Monatsbl. f. Augenhk.*, 1890, p. 10. (Extraction through a meridional scleral incision.)

388. HIRSCHBERG, J. On the results of the magnet-operation in ophthalmology. *v. Graefe's Arch. f. Augenhk.*, vol. xxxvi., 3, p. 37.

COPPEZ (385), as reviewer in Paris, discusses the surgical procedures in cases of foreign bodies in the eye. The following

passages are worthy of note : "in a patient, whose eye has been injured by a penetrating foreign body, the attempt must be made to remove the latter as soon as possible with Hirschberg's electromagnet when it is metallic and there are no adhesions, or with a curette and forceps if necessary, after enlargement of the wound." "When the foreign body has entered through the ciliary region and the eye is threatened with panophthalmitis, enucleation should be done at once." "When the media and lens are clouded, it is best not to interfere, because uncertain manipulations may not only endanger the injured but also the healthy eye." When the foreign body has become encapsuled and causes little irritation, expectant treatment simply is indicated. MARCKWORT.

HIRSCHBERG's (388) paper is a very readable one, but cannot be briefly reviewed on account of the numerous details gathered from his large experience. He advocates the use of the magnet in all cases in which a chip of steel has been shown to enter or is supposed to be present, with the exception of those in which the eyeballs are free from irritation and the foreign body is firmly fixed in the membranes of the eye. Besides probing with the magnet, best in narcosis, the primary meridional incision is indicated directly after the injury, the secondary during the state of irritation, and the tertiary in case of new inflammation, even though it be after years. The prognosis both for the preservation of sight and the shape of the eyeball mainly depends upon whether the patient comes under treatment soon after the injury, whether infection has taken place, and how large the piece of iron is. His conclusions are drawn from the observation of one hundred cases. By extracting the chip of iron from the vitreous he obtained good, even normal sight in four cases ; moderate sight in three ; in six others he preserved the shape of the eyeball. He very properly urges that workmen should wear protecting eye-glasses.

XXI.—OCULAR AFFECTIONS IN CONSTITUTIONAL DISEASES.

389. BERGER. Les troubles oculaires dans le tabes et la théorie du tabes. *Rec. d'opht.*, 1890, pp. 195 and 263. (Essentially a French translation of his paper in these ARCHIVES.)

390. BERGMEISTER. The connection between influenza and the visual organ. *Wiener klin. Wochenschr.*, 1890. No. 11. (The observations of atrophy of the optic nerve are new.)

391. BOUCHUT. Du diagnostic des maladies du système nerveux par l'ophthalmoscopie et la cérébroscopie. *Paris Med.*, March 11, 1890, p. 81.

392. CIRINCIONE. Lesioni nervose nella xerosi con emeralopia. *Giorn. di neuropatologia*, 1890, vol. vii., Nos. 4 and 5.

393. EISENLOHR. The diagnosis of affections of the corpora quadrigemina. *Deutsche med. Wochenschr.*, 1890, p. 937.

394. GEILL, M. Badet ablissement te Pelantrengan (Java). Lepraverslag over het jaar, 1889. *Geneeskundig Tydschrift vor Nederlandsch. Indie*, Deel xxx., off. 1 en 2, bl. 47, Batavia, 1890.

395. HAAL. The effect of influenza on the eye. *Correspondenzbl. f. Schweizer Ærzte*, 1890.

396. LANDSBERG. Visual disturbances after influenza. *Centralbl. f. prakt. Augenhk.*, vol. xiv., p. 141. (Neuritic atrophy.)

397. LAQUEUR. A case of binocular embolic iridocyclitis after influenza. *Berliner klin. Wochenschr.*, 1890, p. 816.

398. v. LIMBECK. A case of gunshot injury of the left cerebrum. *Prager med. Wochenschr.*, 1890, p. 558.

399. MENDEL, E. A case of multiple paralysis of the cerebral nerves. *Neurol. Centralbl.*, 1890, p. 494.

400. PERMEWAN, W. Case of localized suppurative meningitis ; with remarks on the cortical representation of the conjugate movements of the eyes and head. *The Lancet*, Aug., 1890, p. 278.

401. SCHRIMER, O. Unilateral total ophthalmoplegia after influenza. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxviii., p. 312.

402. SULZER, E. Visual disturbances due to malarial infection. *Zeh. klin. Monatsbl. f. Augenhk.*, vol. xxviii., 259.

403. UHTHOFF. Case of dyslexia. *Berliner Gesellsch. f. Psychiatr. u. Nervenkrankh. ; cfr. Centralbl. f. prakt. Augenhk.*, vol. xiv., p. 113.

404. VIGNES. Papillite par influenza. *Soc. d'opht. de Paris*, July 1, 1890.

BOUCHERT (391) reports a case in which an intracranial, right-sided tumor had been diagnosticated during life from choked disc of the right eye. The autopsy revealed a cyst weighing 500 grms. in the right lobe. Under the microscope it proved to be an echniococcus cyst. MARCKWORT.

CIRINCIONE (392) had the opportunity of observing a case of binocular xerosis epithelialis of the conjunctiva, which began

with hemeralopia and headache, was followed by various disturbances of motility and sensibility, and ended in complete desiccation of the conjunctiva and purulent destruction of the cornea. From the conjunctival discharge, small excised pieces of conjunctiva, and the nasal discharge, pure cultures of the well-known xerosis-bacillus were prepared on different soils, which, however, when transferred to the conjunctiva and anterior chamber of the rabbit did not prove to be pathogenic. (Cultures from the blood and spleen gave negative results.) As the patient died of an intestinal tumor, the author was able to examine the tissues in question under the microscope. Nothing abnormal was found in the eyeballs, optic nerves, or brain, but both Gasserian and ciliary ganglia showed marked changes as to their size and the arrangement of the ganglion cells and nerve fibres. The author therefore concludes that the symptoms, repeatedly observed during xerosis, of partial and general dryness and insensibility of the skin of the face, of the cornea and conjunctiva, the ozæna, the hemeralopia, and the diminished tension of the eyeball cannot be attributed to the non-transferable bacillus of xerosis, but primarily to changes in the nerve-centres of the fifth nerve. DANTONE.

EISENLOHR (393) reports on a case of injury of the corpora quadrigemina of the right side by a revolver bullet, which, having healed in, caused a series of successively developing symptoms of central lesions. The autopsy confirmed the diagnosis. The right pupil was wider than the left—both reacted slowly. Sight gradually diminished, without ophthalmoscopic symptoms. Visual field and color-perception normal. Later paralysis of the associated muscles and unsteady gait (cerebellar ataxia) developed. Finally pressure on the brain manifested itself, with stupor, choked disc, and increase of the paralysis of the ocular muscles.

A symptom which frequently occurs in leprosy is the inability to close the lids, so that the cornea frequently suffers. Another cause of the ocular inflammations GEILL (394) finds in the formation of nodules in the iris. In a patient a neoplasm, which covered the pupil and reduced V almost to o, developed in the iris of the right eye. An iridectomy improved it to $\frac{6}{18}$. After two months many new nodules had developed which closed the coloboma. The neoplasms do not occur at the periphery, but in the central part of the iris. They are of a brownish-red color and are bounded by normal tissue. No development of blood-

vessels was observed. Atrophy of the optic nerve is rarely found as a fourth cause. Among twenty-nine patients sight was found normal in only thirteen.

LAQUEUR (397) reports the case of a woman aged forty-three who had suffered with influenza, and who seven days after its beginning became blind in half an hour in both eyes, sight being reduced to perception of light. Acute iridocyclitis with plastic exudation was found. Bacteriological examination of the aqueous gave a negative result. Recovery under atropine and hydrargyrum.

VON LIMBECK'S (398) patient was noteworthy on account of her disturbances of speech. She can only pronounce the syllable ma. Her mental power is not impaired. To decide whether the homonymous hemiopia in question was due to a drag by the injury of the occipital lobe the test applied by Sattler to the so-called hemiopic pupillary reaction was tried; it succeeded, and so an affection of the occipital lobe was assumed.

In MENDEL'S (399) patient, aged twenty-seven and free from syphilitic taint, paralysis of the oculomotor and facial nerves developed in the course of two weeks. Injury, syphilis, tuberculosis, and diphtheria are the usual causes. These, however, were absent, and so a rheumatic paralysis was diagnosticated on account of the rapid recovery.

PERMEWAN'S (400) case was one of traumatic meningitis, accompanied with convulsions. At the beginning of each fit the eyes and head turned slightly to the left for a short time, and then followed a marked deviation to the right, which lasted to the end of the fit. On post-mortem examination there was found suppurative meningitis over the whole of the left frontal lobe, the area of greatest inflammation corresponding with the lowest part of the middle and lowest frontal convolution, Ferrier's centre for conjugate deviation. The two different movements were probably due to bilateral representation in the cortex.

WERNER.

In SCHIRMER'S (401) patient, a woman, aged fifty-four, there was complete paralysis of the oculomotor, trochlearis, and abducent nerves, and incomplete paralysis of the fifth and facial nerves. The cause was sought in a hemorrhage into the middle cerebral fossa.

In malaria cachexia, SULZER (402) observed the following ocular affections: (1) chronic optic neuritis, (2) diffuse infiltra-

tion of the vitreus, (3) numerous small peripheral hemorrhages into the retina, (4) sudden incurable blindness, probably due to central hemorrhages or emboli. During the acute attacks of fever periodic amblyopias of varying degree are observed, sometimes increasing to blindness, marked hyperæmia of the papilla and retina, with loss of the retinal lustre and disposition to affection of the macula lutea from reflected sunlight, and large hemorrhages near the papilla and macula.

In UHTHOFF'S (403) patient, a woman, aged seventy-two, there was rightsided hemianopsia, with the symptoms of dyslexia, disturbances due to a blow with the fist upon the temple. The patient wrote fluently, but soon after could not read what she had written. Memory had also suffered.

VIGNES (404) describes a case of uniocular choked disc due to influenza. The ophthalmic trouble developed on the eighth day of the disease, entirely depriving the eye for some time of perception of light. V however gradually rose again to $\frac{4}{10}$. Galezowski saw four similar cases. Valude observed phlegmon of the orbit during an attack of influenza. Gillet de Grandmont found during the disease a condition resembling coma, with ophthalmoplegia externa. Parinaud thinks that the choked disc in the case of Vignes might have been due to rheumatism, instead of influenza. Despagnet defends the opinion of Vignes.

MARCKWORT.

MISCELLANEOUS NOTES.

A.—BOOK REVIEWS.

Text-Book of Ophthalmoscopy. By EDWARD G. LORING, M.D., Edited by FRANCIS B. LORING, M.D. Part II., Diseases of the Retina, Optic Nerve, and Choroid: Their Varieties and Complications. Pp. vi + 253. New York, D. Appleton & Co., 1891. Price, $5.00.

It is a melancholy duty that compels us to record this volume as only a fragment—never, alas! to be completed—of a *magnum opus* of one of America's most accomplished and energetic ophthalmologists—a work which, if it had been carried forward to its termination in the manner which was followed from the beginning up to the point where death stilled the hand of the writer, would have found a place in the front rank of ophthalmological literature of the time.

The present volume was to have contained the use of the ophthalmoscope as applied to the study of the diseases of the interior of the eye, though of its definite scope and limits we have no intimation. If, however, we may judge from what is here presented in a state which we are allowed to consider as complete, the whole subject would have been treated in a very exhaustive manner. By exhaustive we do not mean a mass of heterogeneous details. It was not Loring's method to consider his subjects in that way. He seems to have had a fear—which, within limits, is certainly wholesome and to be commended—of wearying his reader and drawing attention away from the essential features by an introduction of those details which have no bearing on the main issue. His artistic qualities are those rather of the bold etcher than of the miniature painter; and because of these qualities we are led to doubt whether his work will ever be so

acceptable to the beginner as to the studious practitioner. To the latter, however, it will ever be a delight and ofttimes referred to as a help in time of need.

Loring studied ophthalmoscopy with the enthusiasm of an artist, and that enthusiasm he has carried into his book, and it will be shared by the reader who is at all in sympathy. Of few treatises can this be said.

To come to a more detailed examination of the volume, we find that its broad divisions are into: 1st, Diseases of the Retina; 2d, those of the Optic Nerve; 3d, those of the Choroid. Of these the first, we are led by the editor to infer, was complete, and represents the author's views as he intended them to go to the public. It occupies just two thirds of the book, and shows the author at his best. The study of the vascular system of the retina and the changes it undergoes under various morbific conditions is masterful. We cannot recall anything of the kind that equals it in clearness of conception or crispness and succinctness of statement, and in these particulars it is a model for scientific writing of its kind. We regret to find, however, no notice, either in this or in the previous volume of that striking ophthalmoscopic appearance known as "shot-silk retina." We would have been glad to know how so experienced an observer as Dr. Loring regarded this condition, whether as physiological or pathological, there being reasons, at least in the opinion of the reviewer, for considering it either or both.

Of particular interest is his study of the conditions of embolism and thrombosis of the retinal vessels. His own views, as are well-known, incline to the greater frequency of thrombosis as compared with true embolism.

The chapters on the optic nerve are not so complete or satisfactory, and it was evidently intended to give them greater elaboration before publication. The chapter on the choroid is hardly more than some memorandum notes which the editor found and printed without revision. But even these notes are valuable and suggestive, for Loring was a clear as well as an original thinker, and it is always apparent that he saw things at their relative values and not as isolated and independent facts. In this connection we will quote the following sentence closing the chapter on "Irritation of the Retina":

"The fact that troubles in the nasal passages give rise to functional disabilities of the eyes has lately received a new

impetus from the observation and success of various practitioners who, with good sense, have turned their attention from the prescribing of glasses of almost infinitesimal degrees of curvature to the medication of the real seat of the disease."

The mechanical get-up of the volume is, like that of its fellow, elegant and a credit to the publishers. The drawings, most of which are from the hand of the author, are good; but, on the whole, we think those in black and white better than those in color. BURNETT.

Die Entstehung der Entzünding, etc. (The Origin of Inflammation and the Action of Phlogogenic Agencies, studied by Experiments chiefly on the Eye.) By THEODOR LEBER, Professor of Ophthalmology at Heidelberg. With eight lithographic plates. Leipzig. W. Engelmann. 1891.

In this superbly printed volume of 535 in quarto pages the author has presented not only ophthalmology, but general medicine with a work of fundamental importance, the fruit of eleven years of uninterrupted research. It would be out of place, should we attempt to give here a full abstract of its superabundant contents. An enumeration, with short notes, of the different subjects which the author has so thoroughly, exhaustively, and originally investigated, and of which from time to time he had previously published the results, will convince all of our readers that a conscientious study of the book will place them on the most advanced standpoint of modern medical science, assist them in the understanding of numerous pathological phenomena, and give them a multitude of useful hints as to the rational management of a host of obscure, intricate, and so often deleterious inflammatory processes.

The *first part* treats of the inflammation produced by *moulds*. A unique case of ulcerous keratitis in man—a farmer's girl whose cornea had been injured by an ear of oat—showed (1879) the particles of necrosed cornea pervaded by a dense mycelium of aspergillus fumigatus, as was ascertained by pure cultures. This material Leber used for an extensive series of experiments on rabbits, studying and depicting (on four plates) the various symptoms and phases of corneal ulceration. Then he injected emulsions of aspergillus spores into the anterior and vitreous chambers. The consequences were the most varied pictures of corneal necrosis, fibrinous and aseptic puriform exudation, hemmed in by a girdle of leucocytic infiltration.

Experiments with other mould species were only partially successful, or altogether negative, for instance, with penicillium glaucum the temperature maximum of which being below that of the living body.

The *second part* contains the practically far more important inflammations produced by fission-fungi. Inoculations of septic bacteria, of staphylococcus aureus and albus, and leptothrix buccalis.

The *third part* describes the author's extensive investigations on the phlogogenic properties of extracts of certain fungi and their active principles. He finds that they produce suppuration and necrosis under symptoms identical with those of mycotic inflammation. Sterilized (by boiling) suspensions of staphylococcus produced fibrino-purulent exudations easily, but the author had a good deal of trouble in obtaining an active extract that was free from bacteria. By dialysis and filtration through a large quantity of paper under aspiration he at last succeeded in obtaining, free from cocci, a watery solution possessing the same phlogogenic properties as the bacterial emulsions. The condensed (dry) extract was introduced into the anterior chamber of rabbits, and produced the same inflammation, only in somewhat diminished intensity, as the introduction of cocci. The pus formed by the extract was macroscopically and microscopically like the pus produced by cocci, but cocci were never detected in it.

Treatment with alcohol and ether led, after a rest of eight months, to the formation of a crystalline substance with marked phlogogenic properties, on account of which Leber called it *phlogosin.* The chemical and physical properties of phlogosin, as well as numerous experiments made with it, form the conclusions of this very interesting chapter.

The *fourth part* treats of the phlogogenic action of *chemical* substances and foreign bodies (gold, silver, glass, iron, steel, copper, lead), in various parts of the eye. Furthermore, the action of metallic mercury and its salts, and of arsenious acid, moreover a number of organic substances—gamboge, croton oil, turpentine oil, cantharides, jequirity, indigo, uric acid, and indifferent substances as starch, etc., have been experimented with very extensively.

The *fifth part* contains experiments and remarks on traumatisms and subtile insoluble powders as causes of

inflammation. Section XXXIV., "On the accumulation of leucocytes at the place of the inflammatory irritation, as the result of chemotactic influences of the phlogogenic substances," shows the author as a staunch adherent to Conhneim's theory of inflammation. This part contains further: The causes of emigration of leucocytes from blood-vessels; the origin of pus in the anterior chamber in purulent keratitis; tissue proliferation by chemical irritation; purulent maceration and destruction of tissue.

The book concludes with remarks on the cause and object of inflammation, and the protective provisions of the organism to ward off assaults. Considering the enormous material of original experimental investigation which practically constitutes a thorough revision of one of the most important subjects of general pathology, inflammation, we cannot too urgently recommend the study of Leber's eminently scientific work. The innumerable contributions to the knowledge of the same subject, scattered through books and periodicals in all civilized languages, are extensively quoted and sifted, by which the volume before us obtains a value only inferior to its own intrinsic merit. H. K.

Oculist's Index Rerum, arranged and classified for the Recording of Ocular Diseases, Errors of Refraction, and Surgical Operations. By S. C. AYRES, M.D., Cincinnati. J. H. CHAMBERS & Co., St. Louis. Price, $3.

This well-gotten up blank-book for indexing ophthalmic cases will be of the greatest help for those who in the preparation of papers are in the habit of supporting their views by statistics from their own practice. A special part is devoted to the records of cataract operations. Space is left at the bottom of each page for Reading References and other cases. The book is useful, not only in preparing papers for societies or publication, but also for collecting the material of instruction furnished by our own experience, showing how many cases of the different diseases have come under our care. It is evident that the "Index" is a most desirable supplement to every oculist's daily case-book.

H. K.

Les Annales d'Oculistique, formerly edited and owned by the late Dr. Warlomont of Brussels, have, by public sale, passed into the hands of Drs. Valude and Sulzer, who will continue their publication in Paris. The editors promise that the *Annales* will appear regularly in monthly numbers of 64 or 80 pages, containing original papers, reports of societies, and early abstracts of the

current ophthalmological literature. Address 134 Boulevard, St. Germain.

Drs. Nuel and Van Duyse, for many years connected with the *Annales*, announce that they will continue the publication of this journal in Belgium under another title to satisfy the law. The chief editor will be Dr. J. F. Nuel, professor of ophthalmology in the University of Liège. His address is 28 Rue Louvrex, Liège, Belgium.

B.—OBITUARY.

Dr. George Salmon Norton, of New York, died January 31, 1891. He was born in New Marlborough, Mass., in the year 1851. He graduated at the N. Y. Homœopathic Medical College in 1872. He was appointed surgeon to the (homœopathic) N. Y. Ophthalmic Hospital in 1875, and professor of ophthalmology in the N. Y. Homœopathic Medical College in 1886, on the death of Dr. Liebold. "When the (Homœopathic) *Journal of Ophthalmology, Otology and Laryngology* was established (two years ago) it was most natural that he should be called to the chief editorship, and to his indefatigable energy and industry its unparalleled success has been in a great measure due." He was a well-informed, judicious, and painstaking oculist. "As a diagnostician he was nearly faultless. At the N. Y. Ophthalmic Hospital his deliberate opinion on any doubtful case went unquestioned; he was regarded as a court of last resort. As a prescriber he was careful, able, accurate, and homœopathic." He has contributed to the literature of ophthalmology a number of valuable papers, some also in these ARCHIVES. The journal which he founded is continued under the leadership of CHAS. DEADY for ophthalmology and otology and MALCOLM LEAL for laryngology. H. K.

Dr. Wm. F. Smith, formerly of San Francisco, Cal., and for the past six or seven years a resident of Chicago, died April 7th last of septicæmia. Born in Hancock Co., Ohio, in 1845, he first studied medicine with Dr. E. Williams of Cincinnati, and there acquired that love for ophthalmic surgery which he practised so extensively in after life. Graduating from Miami Medical College as valedictorian in 1868 he shortly afterward went to Europe where he became a pupil of Becker, Helmholtz, and de Wecker, having been for some time *chef de clinique* of the latter. In 1870 he returned to the United States and began special practice in San Francisco. In a few years he had the largest *clientèle* on the

Pacific coast, was one of the founders of the *Western Lancet*, and became attached to the chairs of opthalmology in Cooper Medical College and in Toland Medical College—the latter now a department of the University of California.

In 1884 he decided to leave San Francisco, and after a short sojourn in the City of Mexico came to Chicago. In 1884–5, under the direction of the Chicago School Board he examined the eyes of 2,500 school children—the first time such an examination had been made in that city. During his life in Chicago he was appointed ophthalmic surgeon to Cook Co. Hospital, and to the Alexian Bros. Hospital.

Although his time was largely occupied with an extensive private practice he paid a great deal of attention to the current and other literature of ophthalmology and otology, and his library was very extensive. His knowledge of Spanish, Italian, French, and German enabled him to keep acquainted with the best works in these languages. His love of mathematics is evidenced by a well-thumbed copy of Helmholtz's "Physiologische Optik," which he declared contained all the so-called "new" formulæ which writers were from time to time putting forward.

Dr. Smith made a number of contributions to the ARCHIVES OF OPHTHALMOLOGY, including a description of his own operation for entropion, and of a fairly successful case of corneal transplantation.

At the time of his death he was engaged in working out a new theory of accommodation, which cost him much thought and labor. Had he lived he would certainly have elaborated it in the direction of overcoming some of those difficulties which the old theory certainly presents. C. A. W.

C.—NEWS.

The *German Ophthalmological Society* will meet at Heidelberg, September 14th, 15th, and 16th.

The Second Triennial Session of the Congress of American Physicians and Surgeons will be held at Washington, D. C., from September 22d to September 25th. The meeting of the Ophthalmological Society will be at the Arlington House, September 23d and 24th.

Dr. Dufour has been appointed Professor of Ophthalmology in the Medical Faculty of Lausanne, Switzerland.

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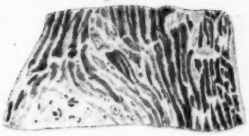

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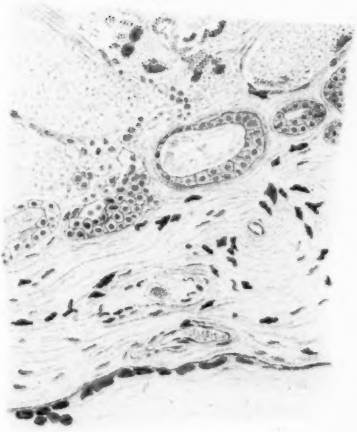

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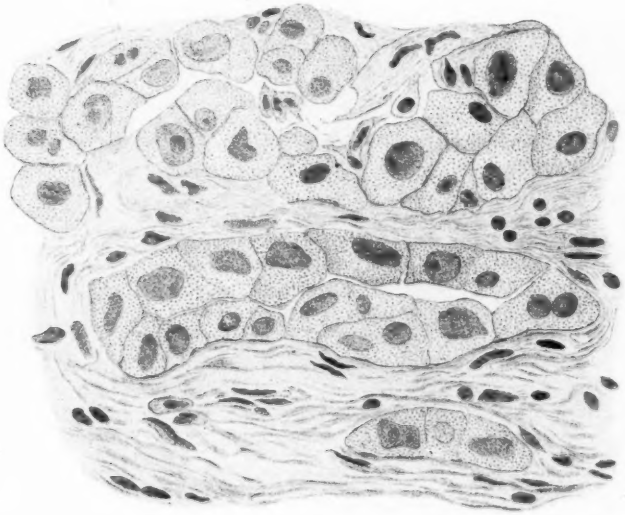

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Fig. 1.

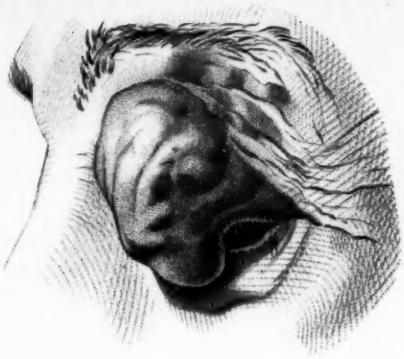
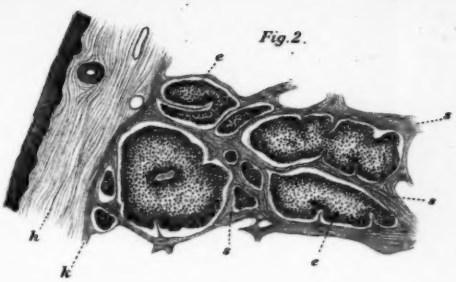


Fig. 2.



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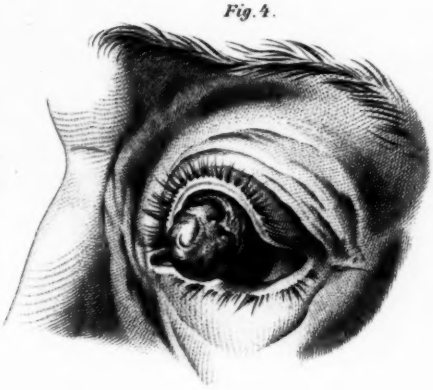

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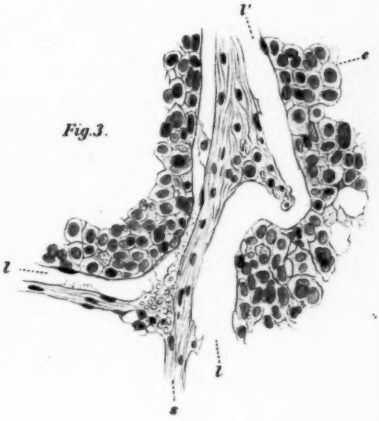

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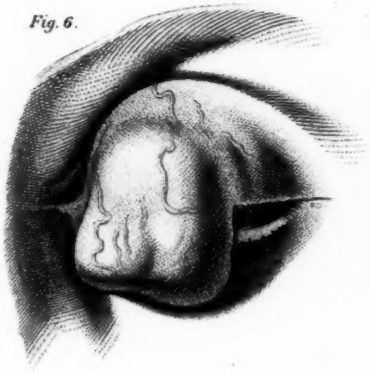

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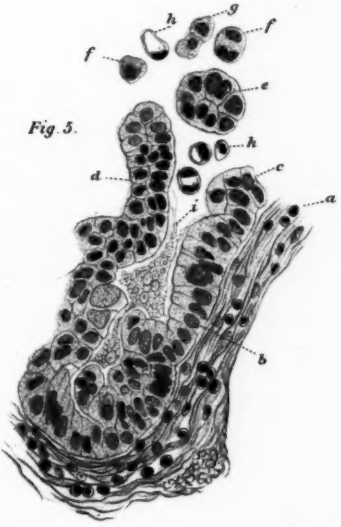

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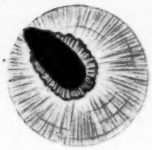
Fig. 11.



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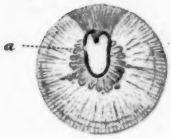
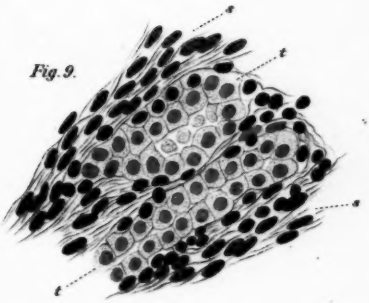


Fig. 13.

Fig. 14.

Fig. 7.

Fig. 9.



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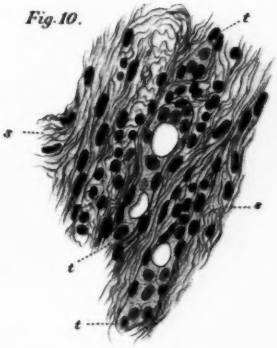

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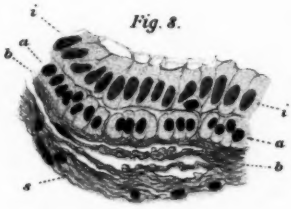

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